

MODEL AIRPLANE NEWS

MARCH 1949 • 25 CENTS



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AWARD OF THE famed Collier Trophy (outstanding aviation honor each year) to the X-1 supersonic speed achievement pays official and lasting recognition to this event as the historic beginning of Era II in aviation: the supersonic age. The Collier Trophy recognized the three foundation stones of Air Power: research, development and use. John Stack, aerodynamicist of the NACA, provided the basic research data; Lawrence D. Bell, president of Bell Aircraft Corp., provided the detailed design and construction of the vehicle; and USAF Capt. Charles Yeager provided the piloting skill and courage needed for the achievement. But just as the Wright Flyer of 1903 was merely the dawn of a new age, so too is the Bell X-1 merely the early, shaky beginning of an equally brilliant age in flight. Already it has been joined by the Douglas D-558-II *Skyrocket*, Northrop X-4, McDonnell XF-88 *Voodoo* and Vought XF7U-1

too "hot" for primary training and will order the Navy Fairchild XNQ-1 primary trainer for the purpose. To be known as the T-31, this slim monoplane was designed to replace the North American SNJ in the Navy and now winds up in production for the AF!

DETAILS ARE NOW available on still another trainer, the Douglas XT-30, which lost out in competition with the T-28 for the big production award but received an experimental contract. The design features a "buried" aircooled engine, the Wright R-1300, in the fuselage. Span is 36 ft. 4 in., length 36 ft. 9 1/2 in. The 6000 lb. craft has a top speed of 286 mph at 10,000 ft. The \$550,000 contract is for a mockup of the airplane together with a special test stand mockup of the complete powerplant.

NAVY HAS FOLLOWED the boyhood practice of "carrying a little knife to open the big knife" in its new jet engine starter.



Here's a hot radio controlled "model"—the newest target ship of the USAF, mounted on its catapult. The OQ-19A hits a speed of 220 mph with 4-cylinder, 60 hp engine. Weight is 300 lbs., span 12' and full controls including ailerons enable plane to do every conceivable maneuver; landings are by parachute. Anybody want one for the R. C. event at this year's Nationals?

Cutlass in test flights. Soon the Lockheed XF-90 and Republic XF-91 will be airborne, and so the sonic procession begins to form.

THE HARD FOUGHT battle for the Air Force twin engine trainer award has been won by the Convair *Liner* (over the Martin 2-0-2, Beechcraft *Twin Quad*, Burnelli *Loadmaster*, North American XAJ and several others). 37 of the *Liners* have been ordered in two different versions. The T-29 will be the standard *Liner* with 14 navigators tables and equipment in the cabin. The XT-32 will be a special, modified version for use as a bombardier trainer. It will feature a bubble enclosure for pilot and copilot, a bombardier nose with special radar scopes for instructor and student. Radar antenna is mounted in a special bubble enclosure in the belly. The XT-32 will carry 7200 lbs. of practice bombs and camera equipment to record bombing results.

AFTER EXTENSIVE DESIGN study the AF developed the North American T-28 as the standard trainer capable of carrying a student from his first flight through advanced training. 268 of the new trainers were ordered and it appeared that the "new look" in AF training had arrived. Now, however, AF has decided that the T-28 is

AiResearch has developed a little turbojet engine to be used to start the big turbojet engines on Navy fighter and patrol aircraft. The new starting unit is actually a miniature turbojet engine in every detail; compressor, combustion chambers, turbine wheel, etc., with one important difference: instead of putting all the air into the jet, some of it is bled from the compressor and piped to a small air-operated starter mounted on the jet engine. The system is actually lighter than the present battery-starter combination, can be used to start several engines in a multi-engine bomber, and can be used to operate all sorts of accessories and equipment in the airplane in flight. But it's not going into any present types. It will be used in two new (and big) Navy airplanes they won't talk about yet.

ALTHOUGH WE ARE GETTING used to high powers in aircraft jet engines (5000 hp in the new Pratt & Whitney *Nene* at 375 mph) it's awfully hard to realize that there's now an aircraft engine that develops 10,000 hp! The new Northrop *Turbo-dyne II* actually delivers that much power to the propeller shaft and there's plenty left over for jet thrust, too! The huge new unit

(Turn to page 5)

MODEL AIRPLANE NEWS

JAY P. CLEVELAND
Publisher

Serving Aviation 20 Years
MARCH 1949 VOL. XXXX—No. 3

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COVER—Powered by the New *Infant Torpedo*, this little cabin model is seen receiving a last checkup before heading for the open places. It may look like a "backyard model," but don't fill the tank full or you'll regret it! Full size plans on page 28.

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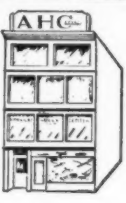
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MODEL AIRPLANE NEWS • March, 1949

2

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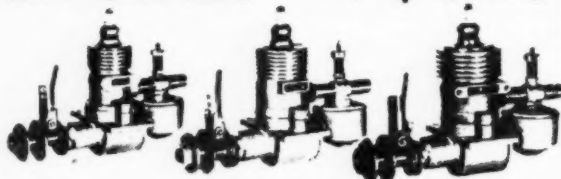
Send remittance in full (two prepay packing and insured) or send \$1 and we ship collect C. O. D. some day for balance. Address your order to us or your nearest branch office.

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Stroke	.562	.562	.562	.772
Horsepower	1/7	1.5	1.5	4
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Propeller	8"	10"	11"	12"
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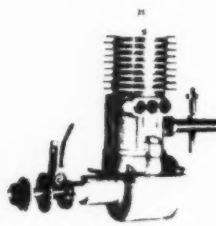
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The Buzz CO₂ is machined to microscopic tolerances, made of the finest materials for your lasting satisfaction.

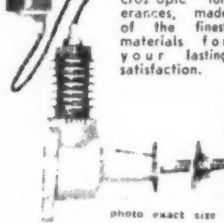


PHOTO - 1/2" X 3/4" X 1/2"

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- FREE FLIGHT OR U-CONTROL

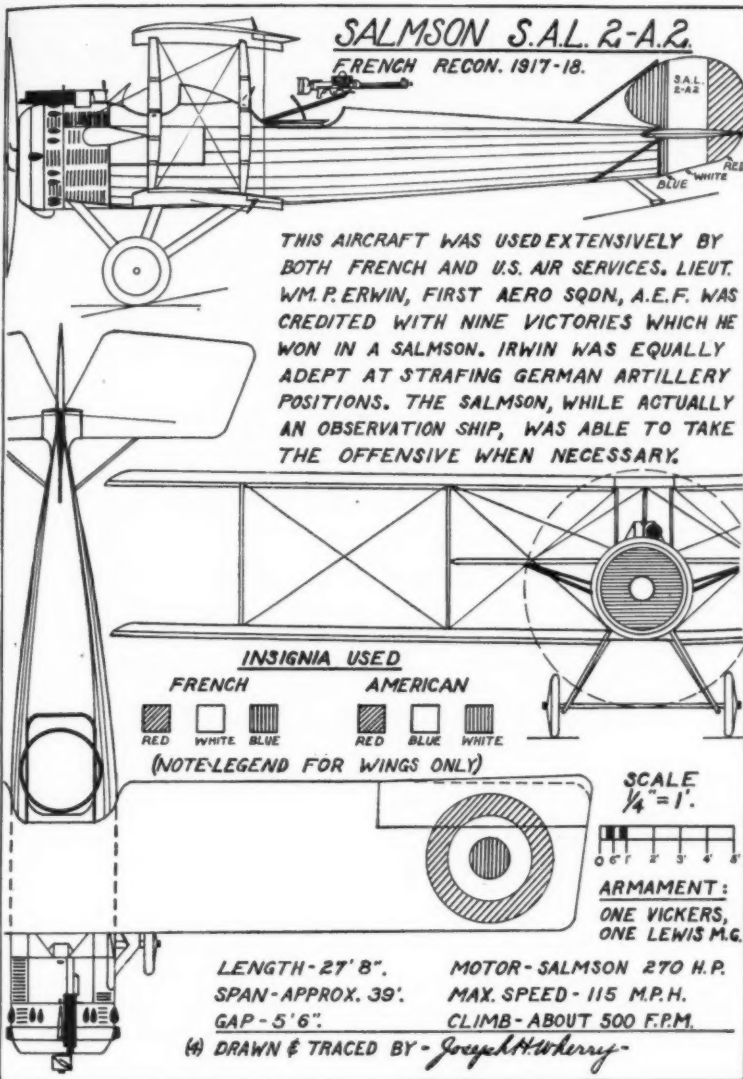
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FRENCH



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(NOTE-LEGEND FOR WINGS ONLY)

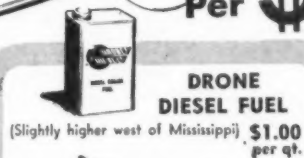
SCALE
1/4" = 1'

ARMAMENT:
ONE VICKERS,
ONE LEWIS M.G.

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(Continued from page 1)
is far too big for anything flying today so AF is going to have to satisfy itself with bench tests for a while. One proposal is to mount it in the nose of a B-29 Superfortress, but it's too much power for even this long range bomber (more than all four B-29 engines combined!).

AFTER EXTENSIVE experimental work, including the modification of stored B-29 bombers at Wichita, Kan., the AF has tried out its new aerial refueling system and found that it works fine! A Boeing B-50 of the Strategic Air Command recently took off from Fort Worth, Tex., flew to Hawaii, turned around and flew back to Fort Worth, 9400 miles without stopping! It was refueled three times in the course of the journey (twice over Southern California and once over Hawaii) from modified B-29 "flying tanker" supply planes. The flight took 40 hours (that's from 12 noon today to 4 A.M. two days from now!) but set no records! Although planes have stayed aloft much longer than this and flown much farther, the F.A.I. has discontinued its endurance and distance-with-refueling categories. Navy still holds the distance record at 11,236 mi. set in the Lockheed XP2V-1 "Truculent Turtle."

THE ARGUMENTS. PRO AND CON, over mid-air refueling have raged for the

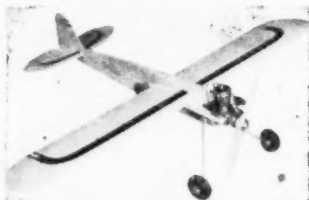
past two years, the point being its value when you have to hold the territory en route from which the refueling plane operates, so why not start the bomber from that point! Actually, the way the system works in military operation is something like this: two bombers take off together, one loaded with bombs and fuel, the other with fuel only. At a distance of 1/3 the range of the tanker, half of its remaining fuel supply is transferred to the bomber. The tanker then returns on its remaining 1/3 supply of fuel. Thus fuel supply in the bomber replaces that it has used on the first third of the flight so that it can now fly as far from this point as it could from the takeoff point. This is a 50% increase in its absolute range; or, another way, its total range has been increased 1/3 by mid-air refueling. These proportions are of course approximate and depend on the bomb load to be carried, the distance to the target, etc. But it's an effective way of beating old man Breguet!

THE MONSTER CONVAIR XC-99, world's largest landplane, has undergone a change in landing gear with its huge single wheels being replaced by the four wheeled trucks of the B-36 bomber counterpart. The increase in wheels means that a single point on the runway now must bear only

(Turn to page 50)

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REPORT FROM THE WEST

by "Tip" Hannon

WE made some resolutions for 1949 and will tell you about them in this column because they concern you—

RESOLUTION NO. 1. We resolved to start publicizing the All Western Open as early as possible. We have two of these All Western Opens under our belts now and maybe number three will be the lucky one for all of us. This may be awfully early in the year, when the weather is still fit for skiing and the like, but we here in the West don't have to take a back seat for anyone—we can make the rest of the country sit up and take notice of our efforts with the All Western Open if we get an early start and then carry through.

We certainly have the facilities, as well as the caliber of modelers who will stand up with the best of them. Just as other sports have their eliminations leading up to the big show, there's no reason why our Open can't be the one big show here.

An early get-away toward giving this Meet a shot in the arm will help make it a truly bang-up affair. So all you club prexy's should start the wheels of your organizations rolling—now. The powers behind the Open are already laying the groundwork. Let's all resolve to keep pace with them and we'll see a wider group of contestants making a strong effort to par-



Bud Converse of Santa Monica with an original Wakefield design; features a diamond fuselage with added cabin

there's no reason why it won't be out here where there are no more eager and enthusiastic hobbyists.

We believe this is a good thing for the entire hobby and hence have resolved to do all we can to help it become a success. It is certainly timed well: just before the flying season gets started in full swing. (Actually I don't like the word season because out here we get to participate in Meets most of the year around—except when it rains!)

We understand from those in charge (who are modelers—you should see the planes they have tossed together) that clubs can participate. So, for further information drop me a line.

* * *

Well, modelers, that was our modest list of Resolutions for 1949. Maybe you have made some that will also benefit the sport we both love. If so, let the rest of us hear about them so that we may perhaps help achieve your objectives.

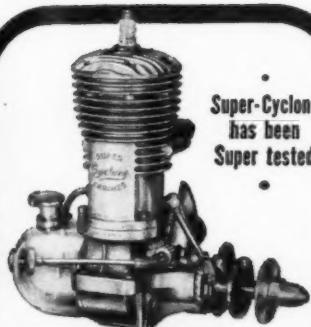
Marvin Forman with his 12 ft. span towliner. In background is Fred Walter's Laister Kauffman sailplane



ticipate—we never again want to hear the accusation of "All Los Angeles Open."

RESOLUTION NO. 2. This part of the country is still going to try to bring about the publication of AMA records on a regular basis during the coming year. How swell it would be if we had a quarterly publishing of the records—at the end of March, the end of June, September and December. Maybe this is making it something like the income tax, but the sport as a whole has always needed something like this. With more and more modelers coming into the hobby each year, it stands to reason that an increasing number are going after records. And with so many attempts at records each week it has been difficult for a fellow to know if he has broken a record, or even be able to enjoy holding the record for a certain time. If you think this a good suggestion, drop us a card or letter—your voices will help achieve this objective.

RESOLUTION NO. 3. This may sound like a pretty big job, but Southern California is lucky this year because plans have already been formulated for a Hobby Show, first of its kind in California, to be held April 26 to May 1. Slated for the Shrine Auditorium, the Show will have areas set aside for actual construction of airplane kits; motors will be exhibited, run and tested. If these affairs could be so successful in Philadelphia, Chicago and New York,



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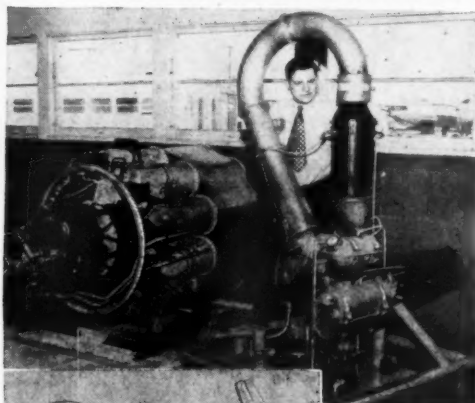
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thrust jet engine now being developed and built in Cal-Aero's Engineering School. The
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NAME

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Check one: ☐ Veteran ☐ Non-Veteran

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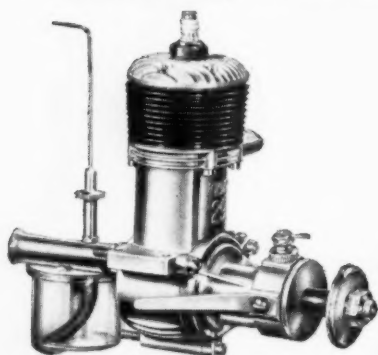
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What do you know about osmosis? Osmosis is that nasty effect that causes permeation of hot fuels right through AeroGloss or any other material used as a fuel proofer even though unaffected by hot fuels themselves! This seepage and the pouring of hot fuels through such open places as the motor-mount and cockpit, etc., causes a softening of your glue and destroys the strength of your dope. This causes great distortion under strain which results in a momentary loss of precision control ending in a crackup! Not from poor flying like you might think, mind you, but caused by an incipiently weakened structure.

That is why AeroGloss products are all hot fuel proof, to end once and for all this costly bug-a-boo. In time, you too will find out why AeroGloss, the 7700 cement, the Plastic Balsa, and the Balsa Fillercoat are rapidly taking their rightful places as the outstanding model finishing materials on the market.

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By **BILL WINTER**

WITH so many friendly holiday letters on hand we are reminded of the pleasant custom of visiting with one's friends on the first day of the new year. Since this is being written on New Year's Day, let's make it a real open house.

Molt Taylor... who is Molt? Well, it's thisaway. We first met Molt during the war. A Navy Commander, he was working under famed Capt. Barnaby at the old Brewster plant at Johnsville, Penna., where the Navy was developing a clutch of assorted guided missiles. Molt is a real guided-missile man and an expert on radio. He also is a model builder, which will explain a lot of things. The first time we met him he dragged out books of plans and pictures on the development of a proposed light-plane which he had tested in model form. Not only was this model dynamically similar, but it had workable flaps and landing gear operated by radio. Molt was flying it free flight and U-control.

When we got home that day there was a letter from Jim Walker about some new radio gadgetry and a query for an opinion. Since we don't know a radio from a juke box, it seemed a good idea to send Jim's letter on to Molt. What happened?

"Jim, the Walker, is a good personal friend by now," says the immovable object in talking of the irresistible force, "and he and I have some of the darndest arguments re RC that you ever heard. The other night he called me LD and talked for 40 minutes re his dancing act with a *Fireball* and wondered if it would be possible to design a lightplane around the idea. When I asked about power loading and stability he said, 'Oh, you work that out, I have wires on mine.' We have lots of fun. Each talking and neither listening. My, my." Molt, incidentally, is the guy behind the *Aerocar*, a flying automobile that makes a great deal of sense. With the prototype under construction, Molt is running his usual radio-controlled tests of dynamically similar models. Keep your eye on that name *Aerocar*!

Speaking of the devil, here is Jim the Walker himself, friendly as ever but a bit impatient with us. Seems that the radio event looked so good at the Nationals that we figured the average fellow now has a chance to have some fun. Trammell—who placed second to the Walker—had, or so we thought, just simple rudder control in a converted *Vagabond*. So we got together with Walt Schroder to design and build a radio model with Good Brothers radio and rudder control. (Free flight tests today really looked good!) Now we hear, thanks to Walker and your editor, that Trammell had proportional control, with elevator and rudder. Is the joke on us? Maybe yes, but maybe no.

"Relative to the radio race, you have completely missed the thought behind this new event," Jim tells us. "From the spectator's standpoint a model airplane contest means practically nothing; but a race between two or more planes fires his imagination, and this is a far cry from watching just one model going up in the air. Everyone knows that a match will outpull a mathematical event ten to one. How many times have you heard it mentioned that 'wouldn't it be super to have a race between two or more radio controlled planes dashing around a closed course?' This is what we have in

mind for the radio race and, of course, the speed attained will be incidental, as it is in the Goodyear Trophy Race at the National Air Races."

Speaking of his tremendous last flight at the '48 Nationals, Jim asks if we realized what that flight meant to the future of model plane design, especially of radio control. No, Jim isn't bragging. He has something there, although it is hard for we fumbler to see so far ahead. Perhaps this is an indication of where RC might go.

"Look at the rules," suggests Jim, "and you will see that very few of the maneuvers now can be done with rudder alone, the high point stunts in particular. I have put on demonstrations recently in Cleveland, Detroit, Chicago and Wright Field, doing at least 12 complicated maneuvers that could not be approached with rudder control alone. To name a few: consecutive loops, reverse Immelmann's, Chandel's, wingovers and rolls. We were successful in starting the motor again and also doing dead-stick loops."

Like we said, this is Open House Day, so we won't go into the pros and cons of rudder-only control, or of the path that RC should follow in the future. We have our thoughts, too, and hope to see more stress on precision of maneuvers and simplicity of equipment. Right now, rudder-only control is giving the *Scrap Box* a chance to fly honest to goodness radio control—and we like it. But more of this next month.

Harold DeBolt checks in with some comments on the new K & B *Infant*. We had been flying a 180 sq. in. free flight with a 210 oz. power loading and doing fine; for contest minded characters who fear 120 oz. loading is a big jump from 100, we suggest that an airplane might fly with a 300 oz. loading! Well, anyway, Harold confirms our own experience with the little K & B, namely that it is a terrific idea.

"We are now in the process of producing a controller for it," he relates. "This is the *Infant Wagon*, a miniature of the *Stuntwagon*. It has about 80 sq. in. area and weighs in at 2-1/2 oz. with a full tank. Of all balsa construction it is aimed at the kids so they can have a 'hot rock' airplane, too. Have about three hours on it in the air and it works fine. Does best on about 30 ft. of line and can perform most of the maneuvers, excepting inverted flight."

What DeBolt says about a kid "hot rock" is right on the beam. A 12 inch, 30 plus square inch job we have does about 30 mph indoors on 15-20 ft. lines. But the amazing thing about these little K & B jobs is that they can be flown for the first time by people who have never built a model airplane. Two bystanders stepped in and flew this little ship without any previous experience.

Chris (Chris the Jeweler) Cannizzaro, El Centro, Calif. has Gremlins among the Jewels. Chris, of course, is a model builder. Recently he put the finishing touches on his Korda model and doped it up as slick as a whistle. The next morning it was full of rips. So Chris patched it the best he could. The same thing happened the next day. "After a few mornings of this heart-breaking sight," says Chris. "I found that the temperature changes of day and night popped my paper. So I want to pass this tip along to other builders: don't dope too heavily if your climatic conditions vary too much, like this desert town of ours."

Richard Grannis takes his modeling seriously. Even lives in the "Model Hotel," Miami, Fla. Has a good tip, too, for R.O.W. men. "One of the last ships I built," he tells us, "was an R.O.W. rubber job of about 200 sq. in. At first I had the usual takeoff problems but finally hit on the idea of dopping several threads across the end of the pontoons. What ho! What a change! The job just popped off the water. I figured that the crosswise threads would break up the surface tension, and they evidently did." Dick is going to build Wakefield models exclusively. What ho!

Dick Schumacher, who served during the year as Chairman of the Precision Acrobatics Committee, says he is a bit tired of hearing complaints about the rules and their limitations. Trouble is that no one offers solid suggestions. While Dick was

(Turn to page 54)



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NEW 1949 "DYNAMIC" SCIENTIFIC

COMPARE IT WITH KITS TWICE THE PRICE! ONLY SCIENTIFIC HAS THIS VALUE!

Carved Fuselage
The fuselage in the kit is completely carved to the last detail requiring only light sanding.



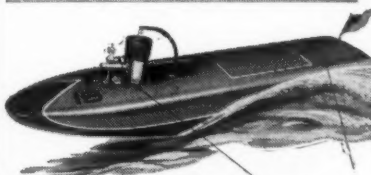
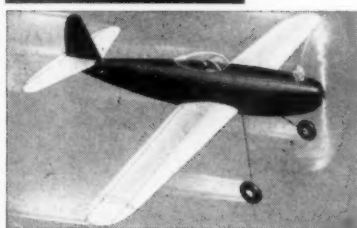
Designed by a prominent stunt flyer, the "DYNAMIC" is so sensationally different it defies description. It may be easily assembled in a few evenings since many parts are prefabricated including shaped and notched leading and trailing edges—just insert ribs. For the fuselage we furnish a ready carved top and bottom that only requires sanding.

SPECIFICATIONS: Large wing measuring 26" long with 8" chord containing 206 sq. in. of area, fuselage length is 22". For all "A" & "B" engines of .099 to .029 displacement and some small class "C" engines. Fly the DYNAMIC either glow-plug, diesel or ignition.

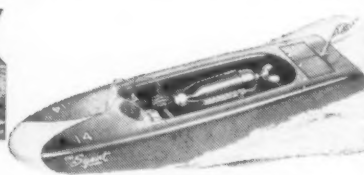
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HERE'S THE PERFECT MODEL FOR YOUR K & B INFANT TORPEDO "The Circle King"

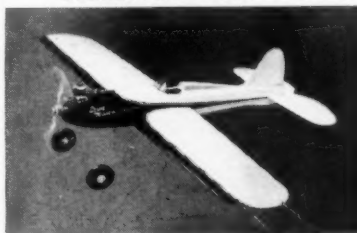
On test flights we powered the Circle King with the new Infant Torpedo and found it to be an excellent combination. Wingspan is 30" and flies on 24 foot lines. The Circle King may also be rubber powered or flown with the Herkimer or Campus CO₂ engines. Complete kit includes bubble canopy, wheels, etc., \$1.00



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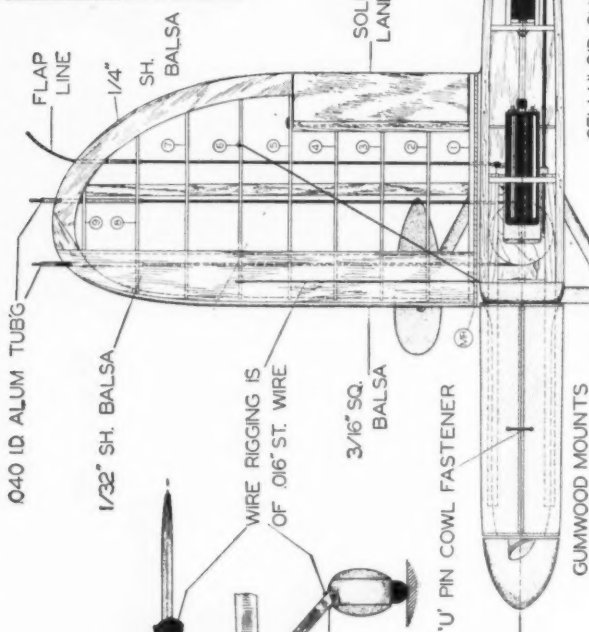
PLATE ONE

SQUARES

3/4" DIHEDRAL

33

DECAL MOUNTED ON UPPER RIGHT AND LOWER LEFT PANELS

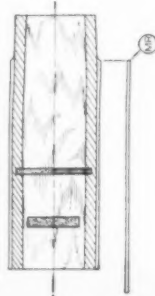


DECAL MOUNTED ON LOWER RIGHT AND UPPER LEFT PANELS

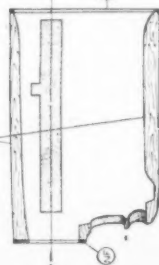
SOLID BALSA LANDING FLAP

3/16" SH. BALSA

WING MOUNT PIECE



1/16" PLYWOOD



VERTICAL SPLIT ENGINE COWL

FRONT

REAR

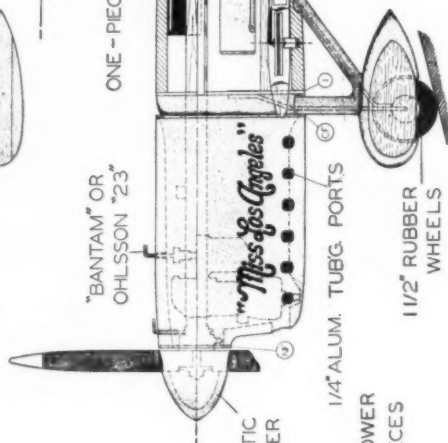
PLASTIC SPINNER

HINGE LOWER COWL PIECES

1/4" ALUM. TUB'G. PORTS

1 1/2" RUBBER WHEELS

"BANTAM" OR OHLSSON "23"



RUBBER TUB'G.

33

PENLIGHT CELL BOX

ARDEN COIL AND TIMER

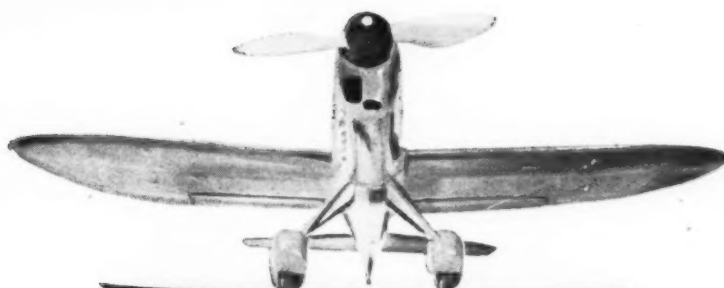
COLOR SCHEME IS: FLAMING RED AND GOLDEN TRIMMING



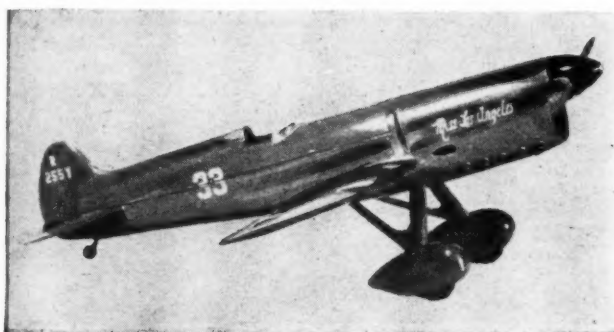
GABE BEDISH

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THIS
WINNER**

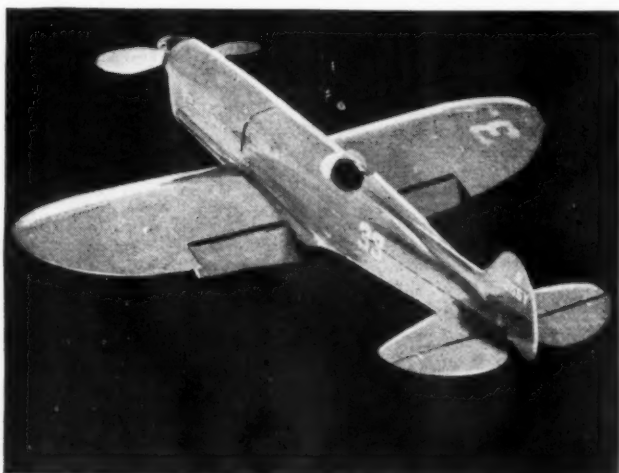
Miss Los Angeles



by **GABRIEL BEDISH**



An advanced design in 1934, this slick ship is still a modeler's favorite



DESIGNED by Lawrence W. Brown in 1934, *Miss Los Angeles*—one of the foremost in the ranks of immortal racing planes of pre-war days—was a challenge to the super-powered class of racers which dominated the events of that day by their brute speed.

Mr. Brown's protegy was an outstanding example of applied strategy and proved to be one of the most formidable contestants in racing competition for many succeeding years. This conception, though powered by a 300 hp Menasco *Buccaneer* as against the then conventional 1000 or more hp powerplants, gained her advantage through the use of lighter wing loading and cleaner design.

Possessed of a much higher degree of maneuverability than her competitors, the craft, with a top speed of only slightly over 270 mph, gained a decisive advantage on turns and other situations in which a high degree of maneuverability could be exercised to advantage. With this ability the craft could outstrip the field by twenty miles. Its general specifications were:

WING SPAN	19 ft. 3 in.
WING LOADING	21.65 lbs./sq. ft.
WING AREA	60 sq. ft.
TOTAL LENGTH	19 ft. 10 in.
POWER LOADING	4.33 lbs.
GROSS WEIGHT	1,299 lbs.

Landing flaps produced a low landing speed of 60 mph with flaps fully extended.

A great deal of time and effort were expended through the preparation of two model designs, the latter an improved version of the former and shown here. The inherent beauty of the model in itself is more than sufficient to tantalize the scale advocate, while performance will remove any skepticism which the hot-rod advocate may harbor. Fidelity to scale between the model and prototype was kept almost exact, the general proportions of aircraft of this type being ideally suited for control line work.

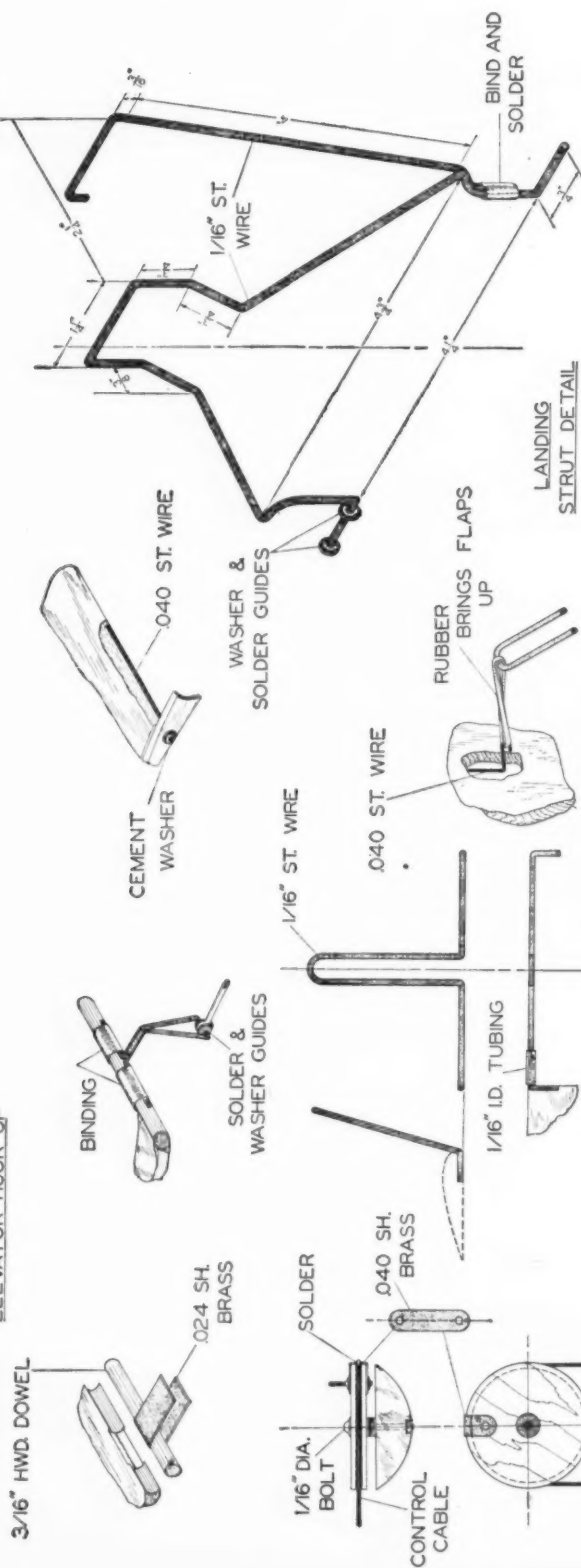
Operating landing flaps of a foolproof design, working in conjunction with the ignition timer, provide an accessory that greatly increases the thrill of flying *Miss Los Angeles*, as well as greatly simplifying the landing operation. Following the tripping of the third line, the flaps lower and a few seconds later the engine cuts.

A new type control system emphasizing a more gradual control and reducing the danger of overcontrolling was instituted with results of a superior nature. Its compact size is also an asset.

Wire bracing of the structure not only increases its beauty by producing a higher degree of scale effect but imparts such great strength to the model that it is almost indestructible. Bracing installation is purely up

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ELEVATOR HOOK UP



1/2" SQUARES

DISK-CONTROL DETAIL

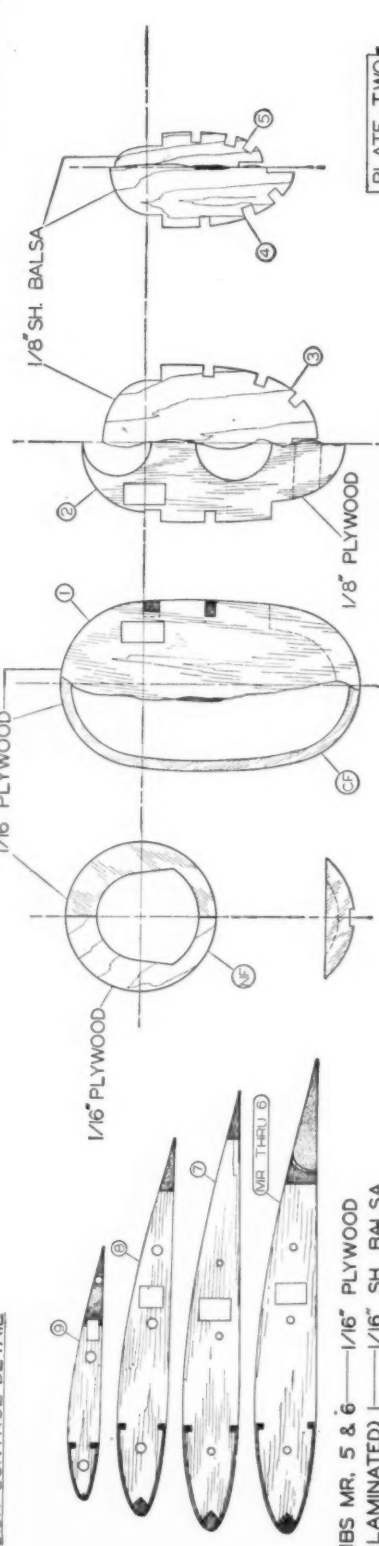
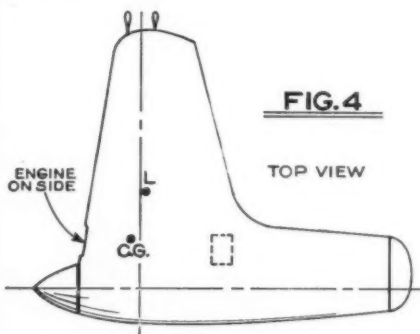
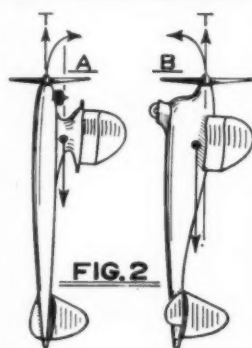
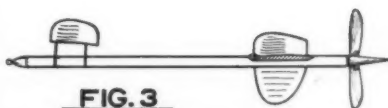
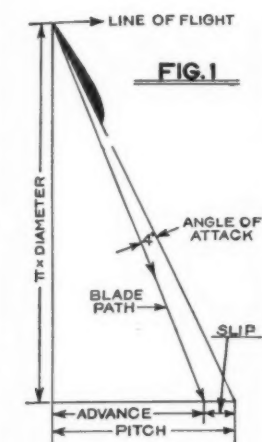


PLATE TWO

design forum



by CHARLES H. GRANT

ONE of the most important problems for modern control-line speed demons is determining correct propeller pitch to obtain a desired speed. At one time or another you probably were one of the milling crowd seen around the hundreds of control-line racing areas that dot the country. You've observed these flying bullets whine around the course at 120 mph or more and have gone home wondering how it is possible to coordinate all the many factors of propeller design so that such speeds may be obtained.

It is not too difficult to design an airfoil section or give graceful lines to your ship, but here you are not only dealing with unseen factors but factors that are constantly changing in value as prop revolutions and forward speed change. Everything must be just right to obtain contest performance, which means speeds above 100 mph. Some of these factors are prop diameter, blade area, blade contour and prop pitch.

The most important one is pitch, yet this alone will not do the job. The pitch may be right for your maximum engine speed but your diameter or blade area may be such that the engine does not turn at full speed and, therefore, your plane does not give its best performance.

The first step is to determine the pitch. This is not difficult. Determine the speed you believe your plane may attain; if it is powered with a large .6 cu. in. engine it is not too much to expect 120 to 130 mph. At least it is best to shoot for this mark in designing the propeller. At 120 mph the plane is traveling 10,560 ft. per minute or 2 miles per min. Modern engines of this displacement will turn 10,000 rpm

or more, some as high as 15,000. Of course, engines running with no load will turn much faster, but here it must swing a propeller. Suppose we say that the engine turns at 13,000.

The pitch of a propeller means the distance a prop will screw itself forward through the air in one revolution without slip. So in order to travel at 10,560 ft. per min. the pitch speed of the prop, or the revolutions per minute times the pitch, must be at least this amount. Actually it must be more because there will be some slip to the propeller due to the attack angle of the blades. If there is no slip the attack angle would be zero while the prop is turning.

The best attack angle is 3° to 4° (Fig. 1). In order to have the prop move forward at 2 miles per min. the pitch speed must be slightly more, in most cases from 25% to 33% greater. If a prop turns at 13,000 rpm with a 12" pitch, the pitch speed will be 13,000 ft. per min. However, the actual distance traveled forward will be in the neighborhood of 10,500 or 2 miles per min. because the slip speed will be equal to about 250 ft. per min. A smaller pitch will give a proportionately smaller pitch speed and, therefore, less flying speed. If the prop pitch is only 6" and the engine turns the prop at 13,000 rpm the actual speed of the plane will be approximately 1 mile or 5280 ft. per min. Remember that a plane never can go faster than its pitch speed whatever that may be.

After you have your propeller designed for the proper pitch and the plane does not attain the calculated speed, in this case 120 mph, it means the prop is absorbing too much torque or power and that it is turning at a speed below the

proper amount, 13,000 rpm. To increase the prop speed, the blade area or diameter must be reduced, possibly both. If the blades are long and thin, we suggest cutting down the diameter until it is approximately 8 times the maximum width of any single blade. It is unwise to cut down the diameter more than this. Such a prop will be comparatively short and stubby, but strange enough these give the best results.

In cutting the outline at the tip, do not make the mistake of making the tip sharp. Instead, round it well or even make it blunt because this will result in more thrust for a given amount of torque—which means greater efficiency. If your prop has been cut down sufficiently the prop rpm will increase. If it is still not fast enough, cut down the prop still more until 13,000 rpm is attained. Another trick to make your prop more efficient is to sharpen the leading edge.

Propeller leading edges should not be rounded. Rounding the leading edge of an airfoil is solely for the purpose of reducing stalling tendencies at high attack angles. A propeller blade, however, never acts during normal flight at high attack angles, at least not if it is well designed. It passes through the air at about 3°. At this attack angle there is no need for a rounded leading edge; in fact such an edge will give more drag than a sharp one and no more thrust. The best way to prove this is to try it. We believe you will be pleasantly surprised at the result.

Small points of design like this have been the means of winning more than one contest.

The diameter of a 12" pitch prop appropriate for a .6 cu. in. engine varies between 8" and 10". Blade width of the 8" should be not more than 1", the 10" diameter 1 1/4". If you try such a prop on your ship and find it does not turn up to full speed, cut down the blade width little by little until the proper rpm is obtained.

• •

We have a letter from Adolph Heisler that contained several points of interest. Concerning one of these he says, "I am strongly against pylons and high thrust line." This is rather a brief and all-inclusive statement. It is well to remember that different designs, even the freak ones, have some use, every design providing certain types of performance. It is merely a question of whether you want a particular type of performance that some design may give. For instance, if you wish a model that noses over into a loop or onto its back during a steep climb, the best type to use is a low thrust line with wing located well above the thrust line, in most cases mounted on a pylon. This gives the most beautiful loops imaginable and for a very definite reason.

Due to the wing being high, the center of gravity (CG) or center of weight of this plane is above the thrust line. In climbing steeply or vertically, as in Fig. 2A, you will note that the center of weight W pulls downward to the right of the thrust T pulling up. This forms a force couple which tends to nose the plane over to the right in the direction of the arrow.

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? WHAT'S THE R.P.M. ?

by R. P. TURNER

This simple electronic device will give an accurate indication of RPM—can also be used for vibration study

THE serious designer or builder of model airplanes and airplane motors will find a stroboscope an invaluable test instrument. This electronic device is equally handy in trouble shooting and in performance tests.

The stroboscope emits time flashes of light which may be played upon a rapidly moving machine. When the flash control in the instrument is set to give light flashes at a rate equal to the speed of the machine, the machine appears to stand still. In this "frozen" condition, the machine's behavior may be observed under actual running conditions. For example, the whirling propeller of a model plane might be examined for whip, play, vibration, or bending while it actually is turning at full speed but appearing to stand still. The stroboscope may be used also as a tachometer requiring no physical connection to the moving machine under test. For this purpose, the flash control in the stroboscope is provided with a dial reading in revolutions per minute; when the control has been adjusted to "stop" the machine, the latter's speed of rotation (or other movement) may be read directly from the dial.

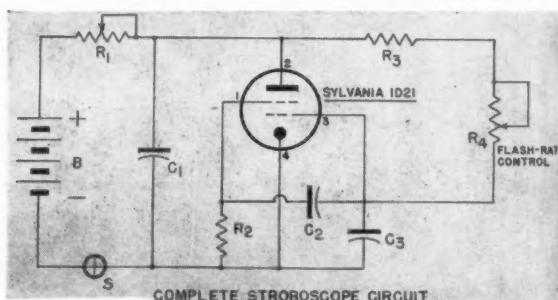
Commercial stroboscopes are rather costly. However, the model airplane builder can construct an efficient instrument within a few hours, using inexpensive radio parts. By making the instrument small in size and operating it from self-contained batteries, a maximum amount of utility will be obtained. This article describes such an effective homemade stroboscope.

BASIC FEATURES. The heart of the instrument is the flashing lamp, or *Strobotron* tube. This component, designated Type 1D21, is manufactured by Sylvania Electric Products, Inc., and is obtainable at radio parts stores. The *Strobotron* tube is filled with neon gas and so emits a reddish colored light. Unlike common radio types, this tube has no filament and accordingly requires no A battery nor filament-heating transformer. Because it is a cold-cathode tube, it is instantaneous in action. The end of the glass bulb may be seen projecting through the center of the reflector in Fig. 1.

A desirable feature of the stroboscope is the fact that it contains no moving parts such as contactors, vibrators, or commutators which might get out of order. The *Strobotron* tube is flashed by means of a simple electronic circuit above. The circuit, which is a self-excited oscillator, contains 3 resistors, 1 rheostat with a switch attached, 3 capacitors, and five 45-volt



Fig. 1 Front view of completed instrument showing 1D21 tube



radio B batteries. All these parts are small-sized. The speed at which the tube flashes is controlled by the setting of the rheostat R_4 . Adjustment of this rheostat will permit flash rates ranging from a few flashes per second to a little more than 14,000 per minute which is the limit of the tube. This range will cover most model airplane applications.

Our instrument was made battery-operated to facilitate its use in the field where electric power lines are not readily available. A stroboscope normally is used only for comparatively short time intervals and the battery drain is not severe. Consequently the batteries should give long service.

Any convenient box or case, metallic or non-metallic, may be used to house the stroboscope. The author found it convenient to use an inexpensive airplane luggage type travelling bag (see Figs. 1 and 2) obtained from a 25c store. The overall dimensions of this particular case are 12" long, 9" high, and 5" deep. The entire instrument weighs no more than the average 4 x 5 camera. There are no external attachments or wires of any kind, an important feature whether the instrument is used in the shop or "on location."

No special tools are needed in the construction. The small tools, such as pliers, cutters, screwdriver and soldering iron ordinarily found in a model builder's shop will be entirely satisfactory. If the builder has had some previous radio or electrical wiring experience, the job of building the stroboscope may be made somewhat easier, but such experience is not imperative. No elaborate calibration equipment is required. The stroboscope speed dial can be calibrated according to a simple procedure which will be described later.

STROBOSCOPE CIRCUIT. The complete circuit wiring diagram is given herewith. Only one tube, the flashing *Strobotron*, is required. The rate at which the tube flashes is governed by the electrical values of the resistors and capacitors in the circuit and to some extent by the battery voltage. R_1 is made variable in order that the flash rate may be controlled easily by the operator. This unit is a radio volume-control-type rheostat.

Capacitors C_1 and C_3 are tubular units rated at 400 or 600 volts. The 600-volt units are the more desirable. However, the 400-volt type may be used if the builder already has them on hand. Capacitor C_2 is a postage stamp size mica unit. R_2 and R_3 are small carbon resistors. R_4 is a 10-watt wirewound

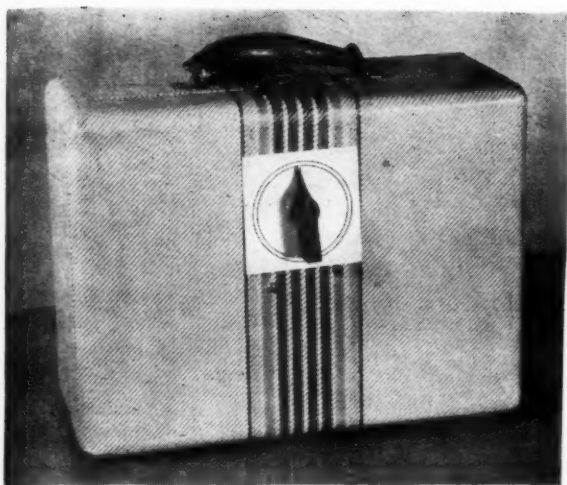
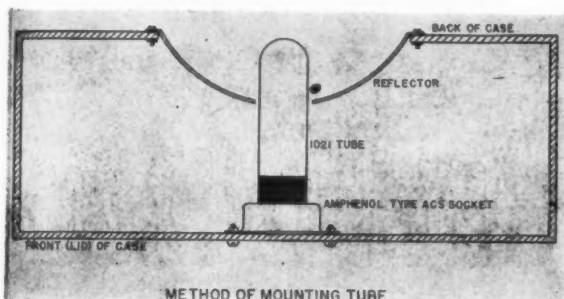


Fig. 2 The single control is mounted on the lid of the case



knob. Simplicity of operation thus is achieved.

MECHANICAL CONSTRUCTION. The stroboscope is assembled easily into any case having dimensions not less than 12" x 9" x 5". The author's use of a small inexpensive luggage case is illustrated by Figs. 1 and 2. The reflector (see Fig. 1) is 5" in diameter and was salvaged from an automobile spotlight. Any similar reflector will suffice. The regular spotlight lamp socket must be removed, and the hole left by that socket reamed out to a diameter of 1-5/16" to clear the Strobotron tube which is passed through this hole.

The reflector is mounted in a large round hole cut in the back of the case. The tube is mounted in a 4-prong Amphenol Type ACS shell-type tube socket screwed to the interior of the front of the case directly opposite the center hole of the reflector. This construction is shown in the tube mount drawing. The aluminum shell of the tube socket has side holes through which the four socket wires may be pulled. To insert the tube into its socket, merely pass it base-first through the reflector hole and push its prongs into the socket. To utilize most of the light from the tube, the base of the reflector must not be higher than the white ceramic disc inside the tube. If a lid-type case similar to the author's is employed, the tube must be removed from its socket (to prevent breaking) before opening the lid of the case on any occasion.

The five batteries stand on each side of the reflector (3 on one side and 2 on the other) perpendicular to the Strobotron tube. Resistors R_1 , R_2 and R_3 , and capacitors C_1 , C_2 and C_3 may be fastened to one inside wall of the case. In mounting these components, it is recommended however that a pair of single-lug terminal strips be used with each. The two pigtail leads of each component then may be soldered to the lugs for mounting purposes, and wires may be run between the lugs to complete the circuit. Rheostat R_4 is mounted through a clearance hole in the front lid of the instrument case (see Fig. 2) directly above the tube socket. A knob is fastened to the shaft of this rheostat, and a paper scale is placed beneath it to be marked off in revolutions (flashes) per minute.

Insulated radio hookup wire must be used for making all connections in the circuit wiring. All connections must be made mechanically tight before soldering. Use a good-grade rosin core solder. Do not use any other form of soldering flux. Keep all connecting leads as short as possible and run them as directly between circuit points as practicable. To prevent sagging or vibrating leads, fasten all long wires to the inner wall of the case with Scotch tape. It will be mechanically advantageous and will do no harm electrically to braid leads together when two or more such leads must run in the same direction for an appreciable distance.

ADJUSTMENT AND CALIBRATION. After assembly of the instrument has been completed and the wiring checked carefully against the circuit diagram, insert the Strobotron tube into its socket. Set the slider tightly on resistor R_1 about halfway between the end terminals. Rotate rheostat R_4 sufficiently to throw switch S to its ON position. The tube should light up immediately and should begin flickering. The reddish light cast by the reflector should be bright enough in a dark room to permit the reading of a printed page placed a foot away. If the light is too dim, change the position of the slider on resistor R_1 to give brighter illumination.

As the knob of rheostat R_4 is rotated to the right (clockwise), the tube should flash more rapidly. If the opposite condition occurs (that is, the tube flashes more slowly as the knob is rotated to the right), reverse the connections to the two outside terminals of the rheostat.

The flashing rate of the stroboscope may be calibrated and the scale of rheostat R_4 marked off in a simple manner without elaborate test equipment by employing an electric motor (preferably of the synchronous a.c. type) whose speed is known accurately. Fasten a pulley or flat disc to the motor shaft and paint a single white or yellow dot on the face near its outer rim. Let the motor reach full running speed, then flash light from the stroboscope on the disc. Adjust rheostat R_4 carefully while watching the rotating disc. At a certain point in the adjustment of R_4 , the dot on the disc will appear to stand dead still. At this point, the flash rate of the Strobotron tube is equal to the speed (revolutions per minute) of the motor, and this figure may be inscribed under the pointer on the R_4 scale. When 2 dots are seen on opposite sides of the disc face, the stroboscope speed is twice the motor speed, and this figure may be inscribed on the rheostat dial. Three spaced dots show that the stroboscope is flashing at 3 times the motor speed; four dots, 4 times the motor speed, etc.

By employing several known motor speeds, or several separate motors of known speed, the complete range of the stroboscope may be calibrated. Calibrate as many points as possible, in order to obtain a completely-graduated scale for rheostat R_4 . After the calibration is completed and the scale inked-in, the paper scale may be covered with a sheet of transparent cel-

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resistor with a slider which must be pre-set according to instructions given later in this article.

The numerals appearing on the 1D21 tube in the diagram are the same as those found on the 4-prong socket into which this tube must be inserted. It is important to operation of the instrument that each tube connection be made to the proper socket terminal exactly as indicated.

The instrument is supplied with 225 volts d.c., obtained from five 45-volt radio B batteries connected in series. The Burgess Type W3OBPX 45-volt battery is a husky, small sized unit recommended for this application.

A switch, S , is provided to disconnect the batteries when the stroboscope is not in operation. For maximum convenience and to provide a minimum of adjustments and controls, this switch is mounted on rheostat R_4 , so that a complete rotation of the shaft of R_4 in a counterclockwise direction will flip the switch to its OFF position. Rheostat R_4 can be purchased with the switch already attached so that no additional installation labor will be required.

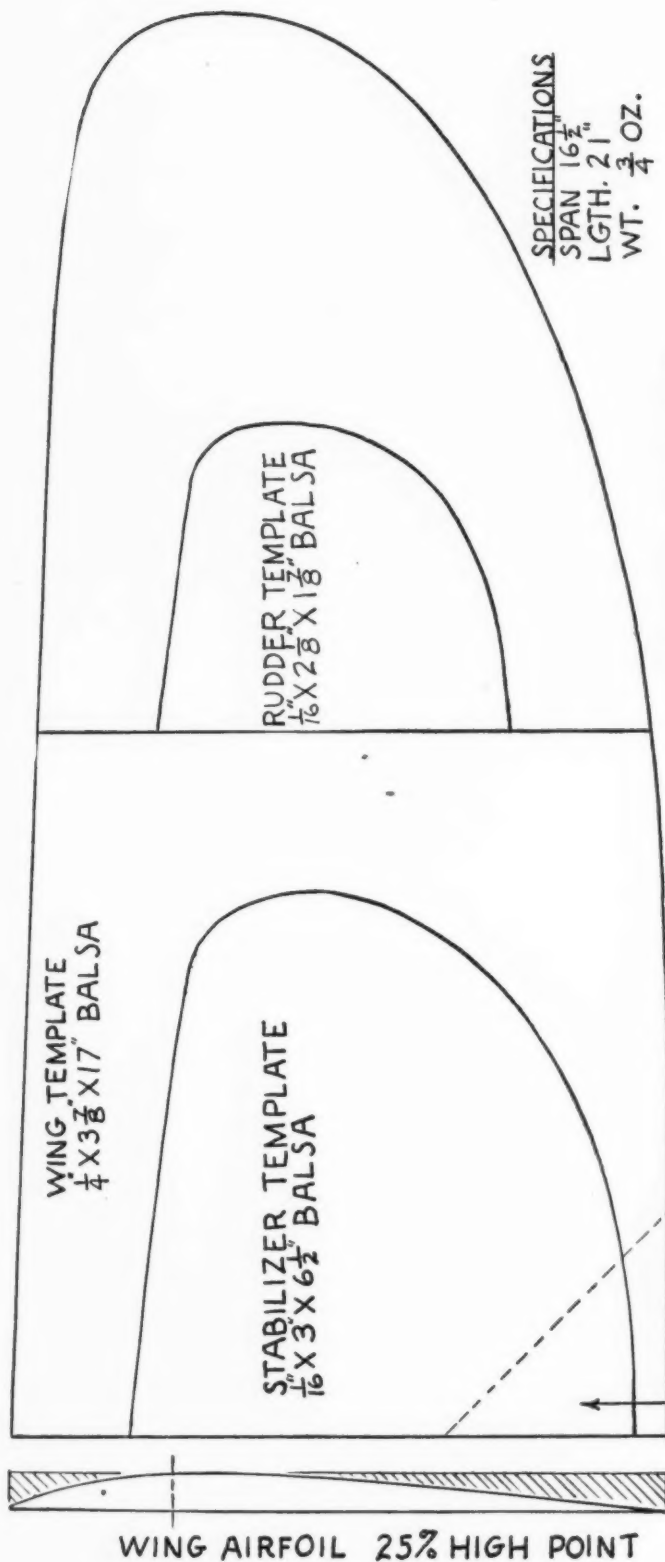
The electrical values of all circuit parts are given at the end of this article. These values have been chosen for best operation and should not be altered. Standard radio parts which run within plus or minus 10% of rated values will be entirely satisfactory.

If an individual builder desires to use the stroboscope on power-line current while at his home location in order to conserve batteries, he may do so simply by substituting a 200-to-300-volt well-filtered d.c. power supply for the battery, B .

Polarity of the battery is very important. That is, the positive and negative terminals must be in the position indicated and must not be interchanged. The Strobotron tube will not flash properly if its plate (No. 2) terminal is not connected to the positive terminal of the battery.

No internal part of the stroboscope will grow hot during operation if the circuit values given are adhered to. This is a desirable feature, since the instrument consequently is easy and safe to handle. Furthermore, there is no danger of electric shock.

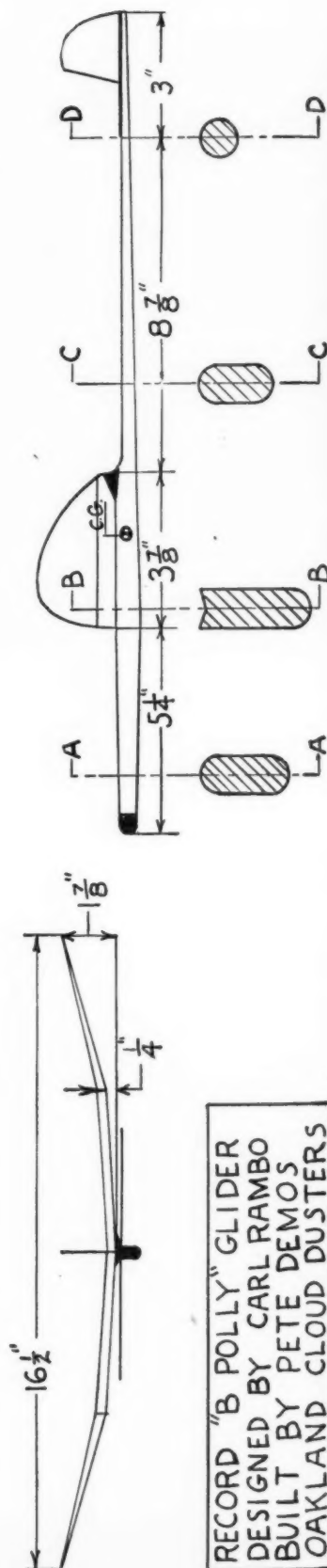
The only adjustable control which must be regulated by the operator from the outside of the instrument case is rheostat R_4 , which is provided with a finger-grip knob (see Fig. 2) and switch S which, being a part of R_4 , is operated by the same

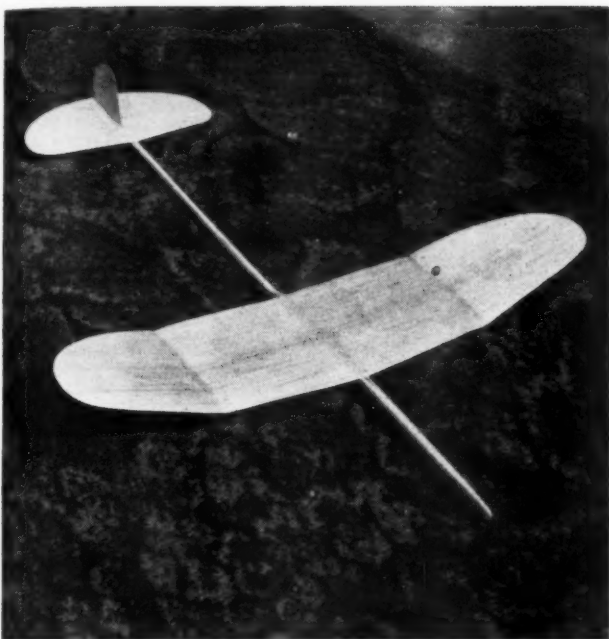


SPECIFICATIONS
SPAN $16\frac{1}{2}$ "
LGTH. 21"
WT. $\frac{3}{4}$ OZ.

NOTE: WING AND STAB.
SET AT 0° INCIDENCE
WING MOUNTED $\frac{1}{4}$ " ABOVE STAB

THROW TAB $\frac{1}{8}$ " HARD SHEET Balsa
FUSELAGE $\sim \frac{1}{4}$ X $\frac{3}{4}$ X 21" HARD Balsa





The Polly Glider

1948 Nats winner, high time holder, a good design indoor and out. Polly is a real champ!

by PETE DEMOS

A NEW national record and an all-time high of 1:12 was established by this polyhedral glider. This event occurred in the blimp hangar at Santa Ana, Calif., during the 48 All Western Open Meet. The record and a first place resulted on the ninth official flight. This overshadowed the sister ships' time, flown by Carl Rambo, by only .4 of a second. The phenomenal 1:12 is attributed to the tremendous altitude this particular glider can attain with little or no loss at the peak of the launch.

The polyhedral glider may not be original or novel, but the research and experimentation carried on by the Oakland Cloud Dusters with this type glider is something to write about. The glider in this article is in reality a product of the combined efforts of a number of O.C.D. members.

The initial attempt at the Polly gliders dates back two years, to the winter of '46 when Mike Demos flew a small Polly at the 60' gymnasium in Moffet Field,

Sunnyvale, Calif. Results were so gratifying that the Cloud Dusters began immediate research in the indoor glider field with polyhedral gliders dominating at every indoor session. By June 1947 the San Francisco "Cow Palace," a 90' high building, was acquired by the club and immediately members went after the glider records. I established the indoor B open record of 1:03.8 with a 33 sq. in. Polly glider. It proved its winning qualities by setting the pace for a first place and a high time trophy at the '47. All Western Open Meet in L.A. The sister ship took a third, with other Polly gliders flown by Cloud Dusters practically sweeping the field in this event. Manuel Andrade in the meantime broke the A record with a time of 1:00.4 which still stands. Further flying in the Cow Palace with the 33 sq. in. Polly established many flights of 1 min. plus but never quite reaching its record time.

Larger gliders were frowned upon due to lack of ceiling and floor space, until

the go ahead signal was given the club by the Navy to fly at the big top at Moffett Field. Hangar No. 1 is approximately 198' high, which meant unlimited possibilities in all phases of glider research. Manuel Andrade set the pace to a new high for B open glider with 1:07.8, only to see this broken a short time later by Carl Rambo with a flight of 1:10.8.

Senior members of the organization were also beginning to boost their times, and Art Wells with Donald Robbers broke the A and B glider records.

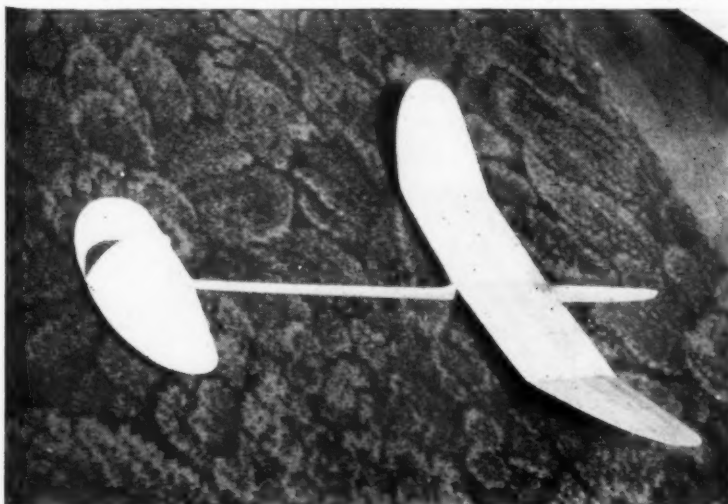
At the '48 Nationals the Pollys began to show themselves in quantity, from various parts of the country. Mike won the high time with 1:03, Andrade placed third, and I was fifth. Mike also placed second, Open Outdoors, with a similar ship.

From these times and places taken it is obvious that these gliders not only are excellent performers but possess a consistency which is so important.

FUSELAGE. This should be constructed from very straight grained stock, flexible yet strong. Cut to size of 1/4" x 3/4" x 21". Draw in the outline, cut and sand smooth. Top and bottom are then rounded out. The nose section should be left rather heavy as it eliminates use of large amounts of clay, and is also needed to balance out the long tail. The fuselage can be sanded oval or round to the rear of the wing, whichever is desired. The deep wing V should be cut and the entire body finished with No. 400 sandpaper.

TAIL SURFACES. Rudder and stabilizer are built from 1/16" flat stock that is faintly quarter grained, not flaky. The leading edge should be the harder part of the stock. This is left rather blunt and a 25% high point built into the stabilizer chord section. The trailing edge is sanded very fine and brought to a sharp edge. The rudder is built into a streamlined design with a finely sanded trailing edge. No. 400 sandpaper is used throughout as a finishing medium. The stabilizer is then cemented on the fuselage with a very

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Anderson Greenwood 14

by ROBERT MCLARREN

IF a poll of all pilots, engineers and airline passengers were taken on the subject: "What should your personal aircraft look like?" the answer would be an accurate description of the Anderson Greenwood 14, our Plane of the Month! All of the millions of manhours that have been expended in talking, reading, writing and thinking on the subject of the ideal postwar lightplane integrate into a side-by-side, tail-boom pusher with tricycle landing gear. And yet today, three and a half years after V-J Day, you cannot go out and buy such an airplane from a factory production line!

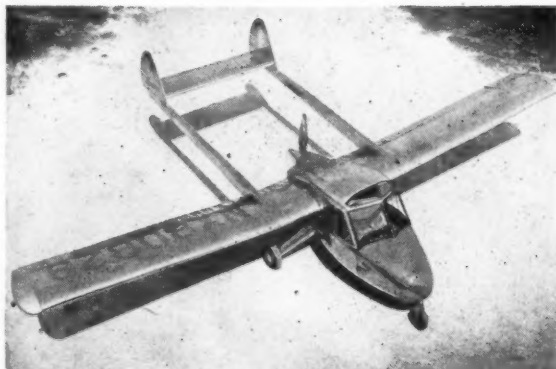
The reason for this paradoxical (and diabolical) situation is quite simple: personal aircraft designers and investors speak two entirely different languages. Today there exists the greatest wealth of technical information ever available to the lightplane designer, and there is no question but what the knowledge is available to design the all-weather, fool-proof, economical and high-performing lightplane that has been a dream for 20 years. Yet where are the investors putting their money? Here is a rough idea: Piper recently bought out Stinson Division, Convair, to obtain a prewar tractor monoplan design; Sentinel Aircraft was recently formed to produce the wartime Stinson *Sentinel*; Ryan bought the North American *Navion*; Texas Engineering and Mfg. Co. bought the *Globe Swift*; and C. G. Taylor has obtained adequate backing for production of his ubiquitous design first introduced in the early 'thirties!

Thus, the designers are heading off to the right towards the 1949 super personal aircraft—on paper—and the men with money are heading to the left towards the pre-war conventional lightplane that development charges have been absorbed on, that tooling is available on and that can be produced cheaply at a profit! However, this latter attitude, while not conducive to the maximum technical progress does provide the public with lower cost lightplanes, the kind you or I can buy at a reasonable price. So this is progress of a different sort, and no poll yet has proved that pilot and even engineers wouldn't gladly dispense with some of their advanced features in return for a lower price tag on the finished airplane!

It is against this background that Anderson, Greenwood & Co. Inc. have produced the AG-14 as a fortunate mating of forward-looking technical interests with sympathetic financial interests. The little group at Sam Houston Airport, Tex. isn't out to undersell the competition but rather to outsell it—on the basis of customer preference outweighing pocket-book resistance! The "company" consists principally of Ben M. Anderson, president, Marvin Henderson Greenwood, vice president-engineering, and Lomis Slaughter, Jr., secretary and chief engineer. These young men are engineers and helped design the wartime models of the Boeing B-17 and B-29. Like hundreds of such young men, they spent a lot of time thinking about the postwar lightplane while making layouts of new bomb-bay fittings and tail-gun installations. Like dozens of other men, they decided to form a company for the development of their "ideal" airplane. And like only a very few others, they have actually accomplished their goal.

As desirable as is the high-wing, tail-boom, pusher layout

(Turn to page 52)

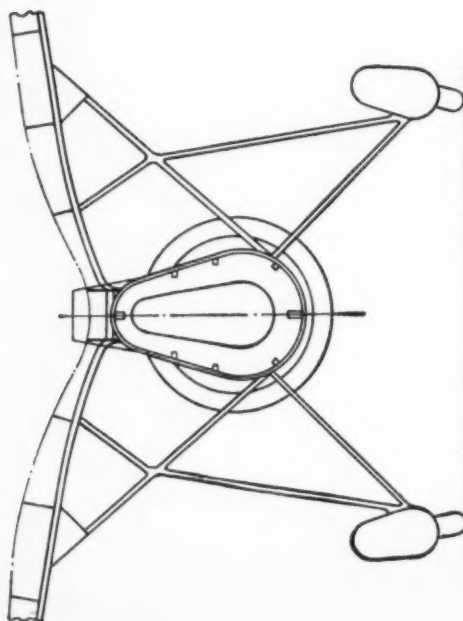


LOIRE 46

FRENCH PURSUIT

SCALE $\frac{1}{2}$ "=1'-0" BY-C.A.KUKUVICH

STRUCT	SIZE	No REQ.
S1	$\frac{1}{8}$ " x $\frac{1}{4}$ " x $3\frac{1}{2}$ "	4
S2	$\frac{3}{8}$ " x $\frac{3}{8}$ " x $2\frac{1}{2}$ "	2
S3	$\frac{1}{8}$ " x $\frac{1}{8}$ " x $2\frac{3}{4}$ "	2
S4	$\frac{1}{8}$ " x $\frac{1}{8}$ " x $2\frac{3}{8}$ "	2
S5	$\frac{1}{8}$ " x $\frac{1}{8}$ " x 1"	4
S6	$\frac{1}{16}$ " x $\frac{1}{8}$ " x $2\frac{1}{8}$ "	2
S7	$\frac{1}{16}$ " x $\frac{1}{8}$ " x $2\frac{3}{16}$ "	2

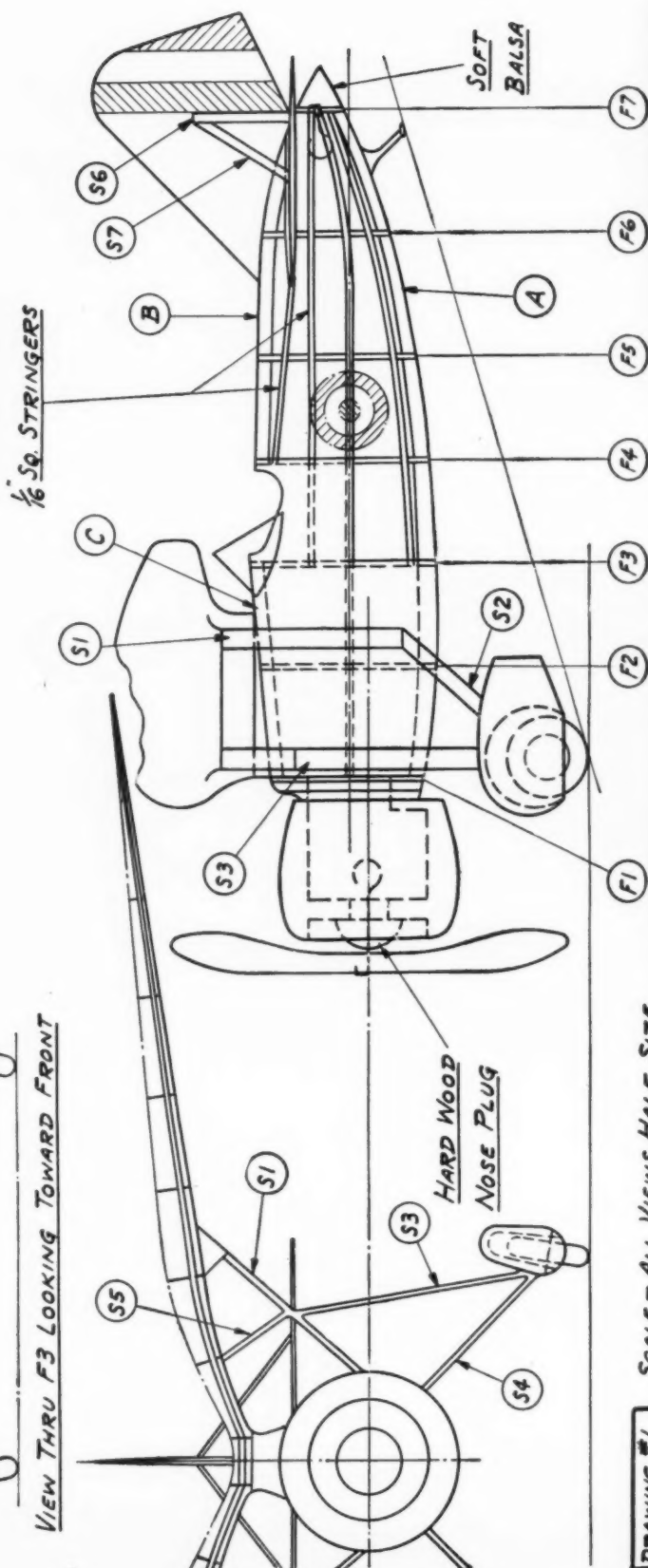


VIEW THRU F3 LOOKING TOWARD FRONT

COLOR SCHEME — ALL WHITE WITH RED COWL & WHEEL PANTS. ADD PROPER MARKINGS.

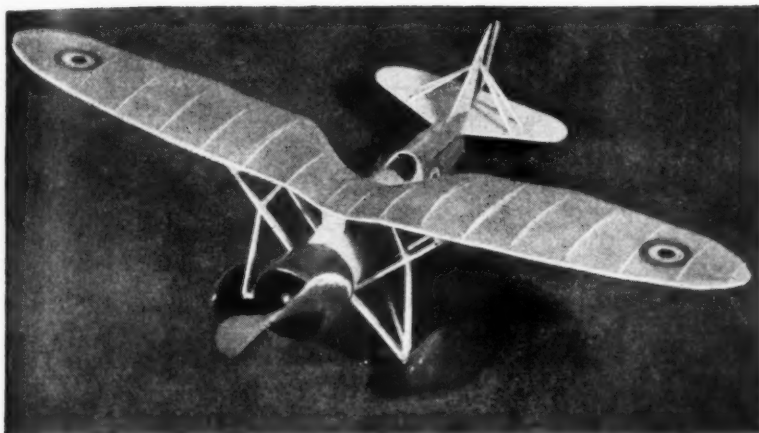
NOTES — THE COWL & WHEEL PANTS CAN BE BUILT UP WITH $\frac{1}{8}$ " SHEET BALSA.

FORMERS BETWEEN COWL & F1 ARE TO BE MADE OF $\frac{1}{8}$ " THK. SHEET BALSA.



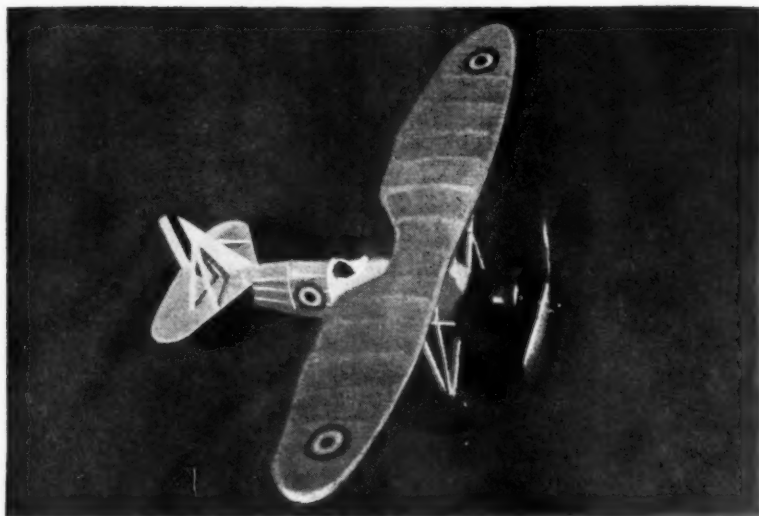
SCALE — ALL VIEWS HALF SIZE

DRAWING #1



Loire 46

by C. A. KUKUVICH



cowl. For the size of the wheel pants, scale up from drawing 1.

After sanding both the cowl and wheel pants smooth, give each several coats of clear dope and sand lightly between coats. Then cement to the rest of the fuselage structure.

WING. This wing structure is a bit different from the usual straight spar type. As shown on drawing 3, it will be necessary to make a full size layout of half the wing, so that the outline shape can be determined. Then, make two of each rib, W1 through W8, from 1/32" thick sheet balsa and make two of spar Z and one each of X and Y from 1/16" thick balsa. By studying drawings 1 and 3, the trailing edge, which is made from a varying thickness of balsa, can be cut out and shaped. The leading edge is made from 1/8" square balsa. As shown on drawing 1, most of the wing can be built on a flat surface. The portion of the wing trailing edge from W3 towards the center is curved. This curved portion can be made by soaking balsa in water and shaping with fingers. Allow the balsa to dry thoroughly before cementing in place. Cover the underside of the wing from W3 to W3 with 1/32" thick sheet balsa. When the wing structure is dry, trim off any excess and sand smooth.

RUDDER. The rudder is made from 1/16" thick sheet balsa, as shown on drawing 2. Cut out to shape and sand smooth to a streamline cross-section. Give the rudder several coats of clear dope and sand lightly between each coat.

STRUTS AND WING STRUT SUPPORT. Struts S1 through S7 are made from hard balsa and sanded to a streamline shape. For size of struts, see Dwg. 1.

Make two wing strut supports from scrap balsa by following drawing 3. These supports can be finished rough and then cemented to underside of wing, as per drawing 1. When the cement joints are dry, sand smooth so the strut supports appear to be part of the wing.

PROPELLER. The prop should be carved from a hard balsa block 1/2" x 1" x 5" long. First cut out the block (drawing 3), then carve blade shapes. Sand smooth and give the prop several coats of clear dope. When dry, sand lightly and give the surfaces two coats of silver dope. Fit the prop shaft together with washer for the bearing and a hardwood nose plug to the prop.

ASSEMBLY. In assembling the model, follow drawing 1. Of course it is advisable to cover the uncovered parts of fuselage and wing with tissue before assembly; many difficulties will be eliminated by this procedure. Care should be taken to get all parts lined up properly before cementing to each other.

If desired, a free wheeling prop can be added. Naturally, such a prop will improve flight characteristics and glide.

The original model was all white with a red cowl and red wheel pants. However, an all-silver model with red cowl and red wheel pants should look very attractive. In either case, markings on the fuselage, wing and rudder are the same. The outer ring of the roundels is red, as is the rearmost tail stripe.

FLYING. Power for the model will vary from 4 to 6 strands of 1/8" x 1/30" thick rubber, depending on the model's weight. Flight test this model the same as others; first try for a nice glide and make any corrections by adding a little weight where necessary. When a satisfactory glide is had, try power flights, using a few turns to begin with and more turns with each additional flight, making the corrections necessary with each flight.

ONE of the last open cockpit pursuit planes the French used was the Loire 46, presented here in a 1 1/2" - 1" - 0" model. The general appearance of the Loire 46 is one of grace and slick design, especially because of its gull wing. Although there have been other gull wing pursuit planes, like the Polish Fighter, the Loire 46 is no doubt one of the cleanest.

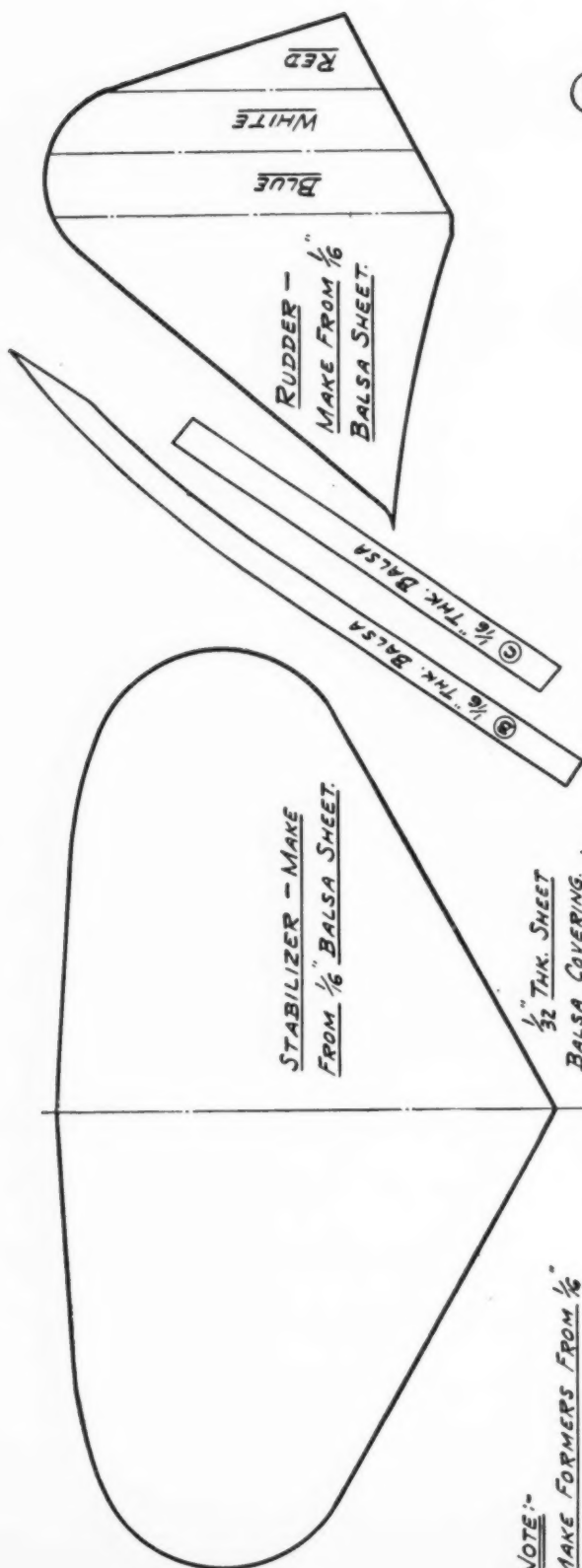
The plans for the model presented here are quite self-explanatory, and with the material below the model can be built with ease. One thing to keep in mind is that weight must be kept down; this is done by using sandpaper liberally wherever possible.

FUSELAGE. First, make the formers F1 to F7 inclusive from 1/16" thick sheet balsa, as per drawing 2. Then, make one of each keel A, B and C from 1/16" thick sheet balsa, also as per drawing 2. Assembly of the fuselage can be started as shown on drawing 1. Use 1/16" square balsa for stringers, and cover formers F1, F2 and F3, also part of F4 with 1/32" thick soft sheet balsa. At this point, it is ad-

visible to place the rear hook for the rubber motor in proper position. Next, add the soft solid balsa piece at the tail and add the two 1/8" thick balsa formers forward of F1. The pieces just added to the fuselage should first be shaped to suit the adjacent forms. Make the stabilizer from 1/16" thick sheet balsa, as shown on drawing 2, and cement in place on fuselage. A piece of soft balsa, 3/16" x 3/4" x 2-1/8" long, should be cemented in place for the wing support, as shown on drawing 1. Now the fuselage structure can be sanded smooth. After this is done, cut out the cockpit shape.

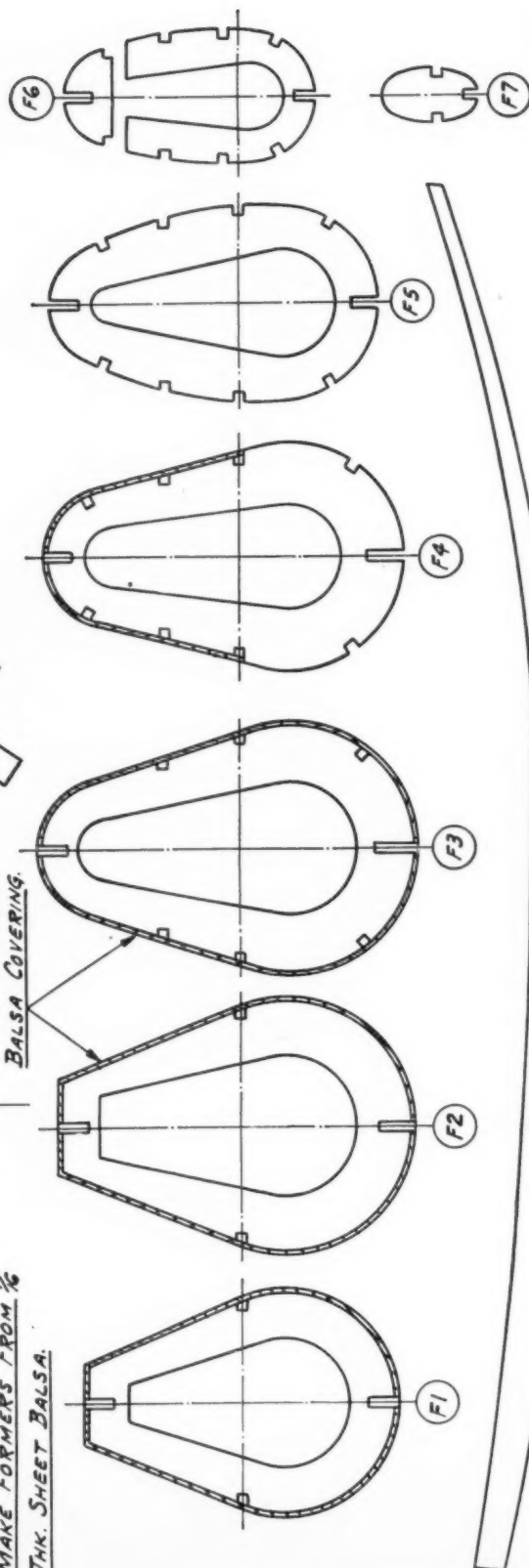
COWL AND WHEEL PANTS. The cowl can most easily be made by building it up of sheet balsa, then shaping and sanding to shape, per drawing 1. Use either 1/8" thick or 1/4" thick sheet balsa for the cowl and cut each layer of balsa to approximate shape before cementing together. By scaling the cowl on drawing 1, the shape and size of cowl can be readily achieved.

In the case of the wheel pants, use the same method of construction as for the



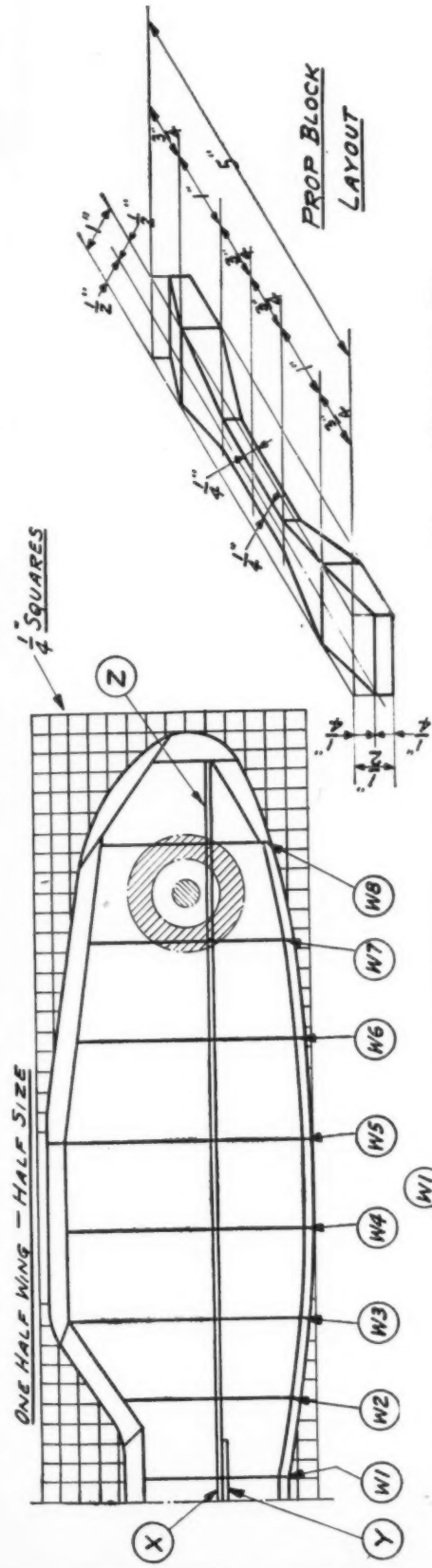
NOTE:-
MAKE FORMERS FROM $\frac{1}{32}$ "
THK. SHEET Balsa.

$\frac{1}{32}$ " THK. SHEET
Balsa COVERING.



DRAWING #2

SCALE - ALL PARTS FULL SIZE

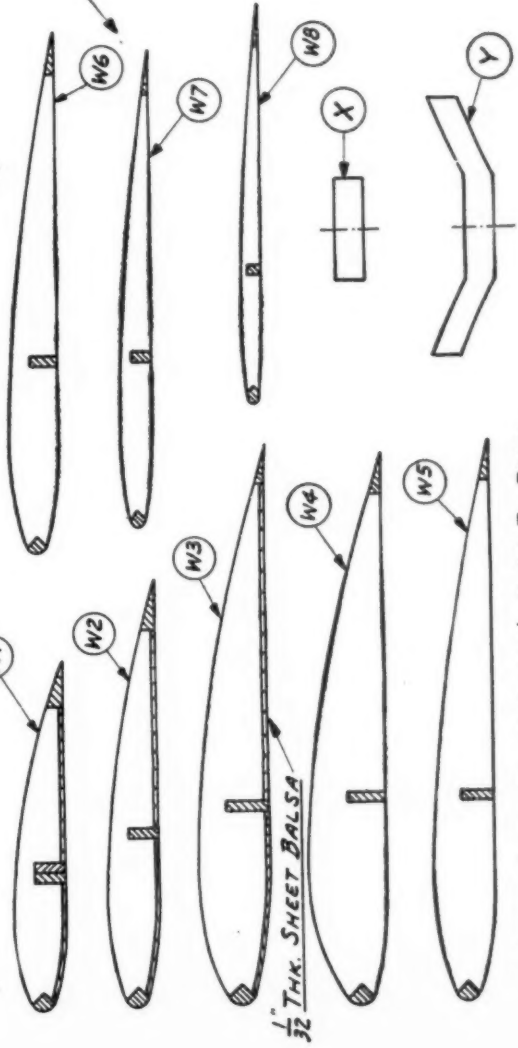


MAKE 2 OF EACH RIB

FROM 1/32 THK. BALSA.

RIB LAYOUTS ARE

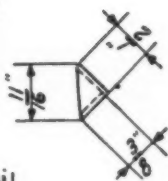
FULL SIZE.



WING STRUT SUPP-

ORT - MAKE OF SCRAP

BALSA. HALF SIZE.



MAKE 1 OF X, 1 OF Y & 2 OF Z FROM

1/16 THK. BALSA. FULL SIZE.



SCALE AS NOTED

Summary of

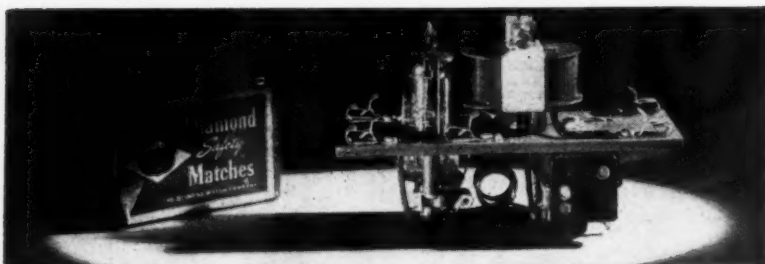


Fig. 1. Beacon receiver compared with matchbox for size; special polarized relay at right of tube

Radio Control



Fig. 2 Transmitter has space for batteries

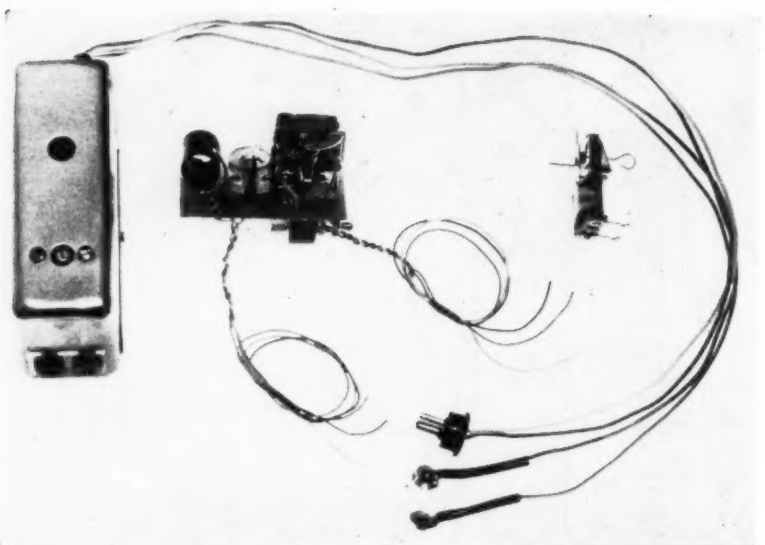


Fig. 5 Complete Aero-Trol system with transmitter, left, receiver next, and escapement right

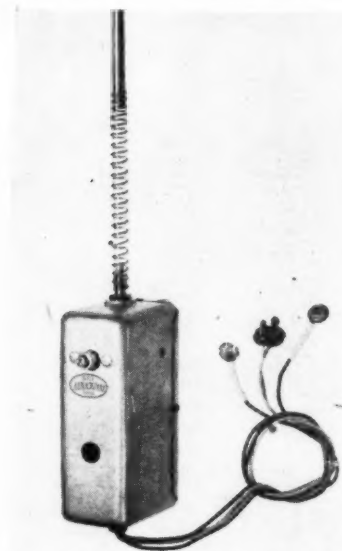


Fig. 6B Special transmitter with compact antenna

by E. J. LORENZ

FREE band!—no license!—multiple channel!—audio control! All these are the goal of the radio control enthusiast. How close are we to them? Perhaps we can give you a fair idea of what is now in use and what we predict for the future.

When we mentioned a year or two ago Class A radio controlled models, and transmitters that could almost be concealed in your hand, there were quite a few raised eyebrows and questioning comments. That was back in the February 1946 issue of M.A.N. Today these things are a reality. This article will describe present equipment and some being developed. And lest the reader assume that radio control is out of his reach in the immediate future because of lack of a license (any transmitter — no matter where it is operated, what the frequency or how low the power—must have a properly licensed operator at the controls), let us say that free band operation is practically around the corner. But more of that later.

Until this new era in radio control arrives, we shall continue to give you information under the current operating conditions. In this article we'll give a summary of two of the most popular commercial units on the market today, as well as data on the new Eveready 1005E cell, thermal relay cutouts, and various other bits of interest to the radio control fan and builder.

Back in 1945, at the National Hobby Show in Chicago, the announcement and first public showing were made of the Good Brothers' radio control system, produced by Beacon Electronics of Pittsburgh, Pa. This system included a transmitter, receiver, escapement and transmitting antenna. The receiver was a close copy of the ones that brought the Goods fame since they first popularized this interesting phase of modeling, some of the differences being in the type tube used and in the receiver's being a fixed frequency affair. The change in tubes was brought about by tube developments during the war. The fixed frequency receiver, first of its kind to reach the market

was settled upon because it made for a more compact and lighter unit, thereby being no bulky variable tuning condenser. The war also brought into general use the now widely used midget ceramic condensers which cut size to a minimum. The Good Brothers' receiver (Fig. 1.) employs a superregenerative circuit with a quench-frequency coil, thus enabling use of an inexpensive high-vacuum tube. Original models used types 30 and RK-42 tubes, while the commercial version uses a 3A5 twin triode, of which only one section is used in the receiver.

Perhaps the greatest advantage of this circuit is its ability to function well over a wide range of battery voltages. The receiver, operating from the A battery of 1½ volts (220 ma. drain), performs well from a new battery voltage of 1.5 down to 1.1 volts. The B supply of 45 volts (approximately 5 ma. drain) gives satisfactory service even when the voltage falls to around 34 to 36 volts. A critical point of this receiver is the sensitivity of the antenna. Care must be taken not to get too close to the receiver antenna while tuning

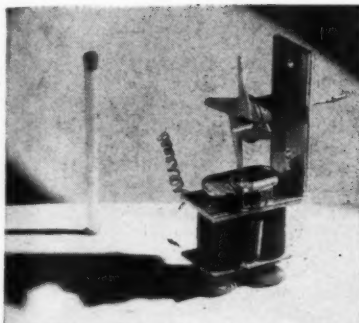


Fig. 3 Beacon escapement is four-arm type

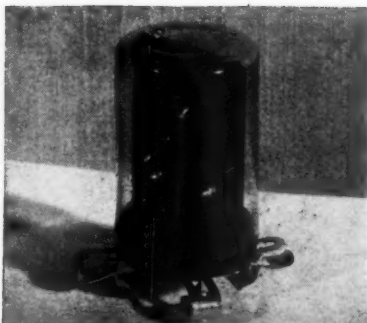


Fig. 4 Thermal cutout in its plastic case

from the transmitter because of "body effect" which detunes the receiver. A little care in placing the antenna in the plane, and in not placing your hand too close to it while tuning, will erase this minor problem. The circuit of the Good Brothers' receiver is given in Fig. 1A. Value of the components are given at the end of this article. This receiver measures 1-7/16" x 2-3/4" x 4" overall and weighs 5 oz. less batteries. The relay was developed by Bill and Walt Good, and because of its polarized design assures very good contact pressure even when set for greatest sensitivity. This relay can be adjusted to operate on a change of plate current of as little as 200 microamps, or .0002 amp.

The transmitter of the Beacon commercial version, Fig. 2, differs from the Good Brothers' original units in that it is of lower power output and is more readily adapted to portable battery operation. It is a one tube push-pull circuit, using a 3A5 tube, the same type tube used in the receiver. This circuit (Fig. 2A) gives an output of 1 1/4 to 2 watts, depending on the individual tube (the author has noted quite a bit of difference in the power output of 3A5 tubes even when used in the same circuit). The power requirements are 1 1/2 volts of A supply at 220 ma. and 135 volts of B supply, with a key-down drain of approximately 30 ma. The antenna used is a folded dipole of 300 ohm twin-lead wire. This antenna may be stretched out straight or formed into a Y for a slightly better all-around radiation coverage. The present transmitter measures 5" x 6" x 9" and weighs about 8 lbs. with the enclosed batteries.

The control surface actuating device is a reliable lightweight escapement, which operates on from 3 to 4 1/2 volts. This unit measures 1" x 1 1/4" x 2 1/4" and weighs 3/4 oz. On 3 volts this escapement (Fig. 3) draws about 300 ma., and such a drain can be furnished by two pencils. While a 300 ma. drain from pencils may seem a bit high for this application, it will be noted from Fig. 3A, that only one short impulse from the transmitter is necessary to place the control in the desired left or right position, or back to neutral. When the control is held at any of the one-half positions, the coils are energized for the length of time it is desired to hold the position. The big advantage of this four-arm type escapement is that no power is used when the control is in a left or right position.

One other big advantage, as used by the Good Brothers at the 1947 Nationals, is the inclusion of a thermal delay ignition switch (Fig. 4). This switch has the heating element connected across the coils of the escapement, and under normal pulsing conditions will not heat sufficiently to cause the bimetal strip to

open the contacts. When it is desired to cut the engine (or operate other devices for a short time), it is only necessary to hold the transmitter key down for the length of time needed to actuate the relay. This thermal switch, as produced by Beacon from Walt Good's design, was scheduled to hit the market very early this year. It measures 1-1/16" in diameter, 1-5/8" high, and weighs 1/2 oz. The time delay action is preset for 4 seconds, when used with 3 volts. Since it is actuated when the key is held down, the escapement is on a one-half position and there should be no danger of too severe a turn with a properly designed ship. Information on another thermal switch will be given later in this article.

All in all, the Beacon radio control unit has contributed considerably toward raising radio control to the high interest level it holds today.

The latest radio control unit to reach the model world is the Aero-Trol set which has been available for over a year. The first circuit diagrams that have been printed on this set are shown in Figs. 5A and 6A. The Aero-Trol receiver (Fig. 5) employs a self-quenched super-regenerative circuit, using the Raytheon RK-61 tube. By using this special tube, and other miniature components, it was possible to bring the weight down to about 2 oz.

As with most other radio control units in use today, both commercial and home-made, it operates in the six meter amateur band and covers 50-54 megacycles. The receiver is of the fixed frequency type, but the frequency may be varied a slight amount by varying the spacing between turns in the tank coil. It has a variable antenna condenser to compensate for length when using a short antenna (about 28 to 30 inches is normal). The presence of hand or body near the Aero-Trol receiver antenna has very little effect on the set's operation. The variable resistor in the B-plus lead compensates for battery voltage and variations in RK-61 tubes. By using the variable resistor and condenser in the Aero-Trol receiver circuit, utmost sensitivity can be obtained. This was proven in tests, while developing the set, when we had reliable operation at a distance of almost ten miles.

This compact unit measures 1-7/16" x 1-3/4" x 2-3/8" and the weight, less batteries, is 2 oz. Because of compactness and lightweight, it is possible to use several receivers in the same plane in order to operate several controls. The fact that the RK-61 tube is used in this receiver causes an occasional comment as to its life and general practicability. However, this tube is used faithfully by "ye olde master", Jim Walker, and in practically all of a certain type of Government R. C. unit. The tube itself is of the sub-miniature type and has life of 4 to 10 hours,

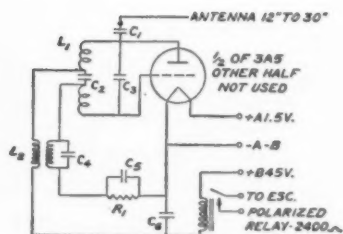


FIG. No. 1A
GOOD BROS. RECEIVER

FOLDED DIPOLE ANTENNA 300 OHM LEAD

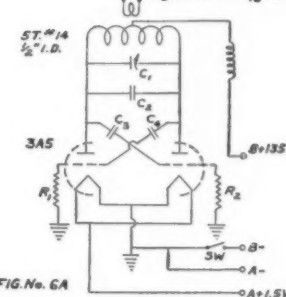
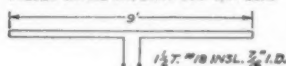


FIG. No. 6A
AERO-TROL TRANSMITTER 50-54 MC. VARI.

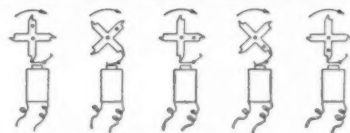


FIG. No. 3A FOUR-ARM TYPE ESCAPEMENT
BLACK DOT REPRESENTS PIN THAT
OPERATES CONTROL ARM.

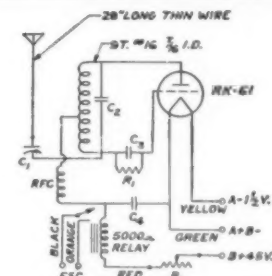


FIG. No. 5A
AERO-TROL RECEIVER 50-54 MC. FIXED

FOLDED DIPOLE ANTENNA 300 OHM LEAD

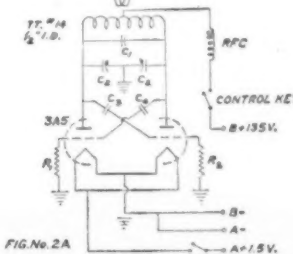
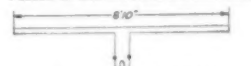


FIG. No. 2A
GOOD BROS. TRANSMITTER 50-54 MC. VARIABLE

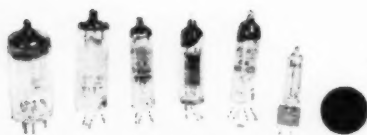


Fig. 16B
Miniature tubes compared to penny (black circle at right)

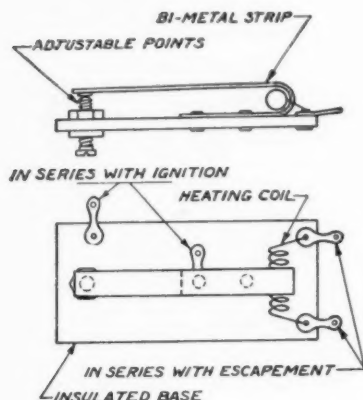


FIG.No. 9
THERMAL CUTOUT

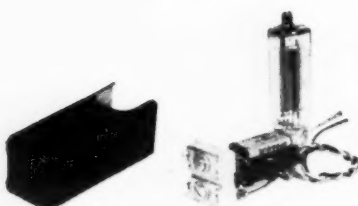


Fig. 10
A tiny receiver, less the relay



Fig. 11
Vest pocket transmitter (for comparative size note circle of half dollar at right)

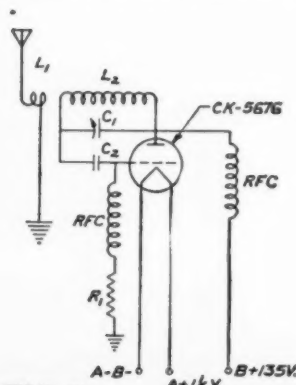


FIG.No. 11A
SUB-MINIATURE TRANSMITTER 50-54 VARI.

depending on the maximum plate current used. Since the RK-61 draws but 1.5 to 2 ma, with no signal, battery life is greatly prolonged and the smallest batteries may be used to save weight and space.

The transmitter (Fig. 6) is similar to the Beacon unit except for circuit values and layout. The 3A5 tube gives an output of 1-1/4 to 2 watts with a power input of 135 volts at 30 ma. The main feature of this transmitter is its small size of 1-1/2" x 2" x 4-1/4". The weight is 4-1/2 oz. and batteries are carried separately. Fig. 6B shows one of the original Aero-Trol transmitters with the portable antenna as described in "Hints and Kinks on Radio Control" in Sept. 1948 issue of M.A.N.

The escapement (Fig. 7) is of the two-arm type and features self-neutralization (see January 1949 issue M.A.N.). Operating on 3 to 4-1/2 volts, it has a drain of about 800 ma at 3 volts. When no radio impulse is received the escapement is in a neutral position. To obtain either right or left position, the transmitter key must be held down for the length of time the control is to be actuated. Upon releasing the transmitter key, the arm returns to neutral and is ready for the next operation. This escapement measures 3/4" x 1" x 2" and weighs 1/2 oz.

This covers our outline of the radio units now on the market. Radio Control Headquarters and Bell Sound Systems each have a unit on the market, but unfortunately we were not able to obtain full details on them. R. C. Headquarters was the first with a commercial radio control unit and at present they also put kits for receivers, transmitters, etc. The Bell Sound Systems unit is a two-channel set employing three tubes each in the receiver and transmitter. The receiver measures 3" x 5" x 7" and weighs about 2 lbs. It is therefore best suited for large planes or boats.

Perhaps one of the outstanding uses of the Bell radio control unit was illustrated when Charles Mooney, owner of Hobby Harbor in Columbus, Ohio gave a demonstration down one of the main streets of the city. Mr. Mooney controlled a 3 ft. car, weighing 25 lbs. along the sidewalks of the busy street, turning corners and even completing tight circles. The racecar type vehicle was propelled by electric motors at a speed of about 5 mph.

And now for a few words on the various photographs. Fig. 8 shows the tubes now generally in use in radio control sets, also several other tubes which can be used in the new 465 mc. band. From left to right they are: 3A5, RK-61, CK5676 (sub-miniature triode by Raytheon), 6K4 (UHF triode by Sylvania), CK608 (UHF triode by Raytheon), and a very sub-miniature triode which has not yet been released to the public. All tubes are shown in comparison to a one cent piece at the right.

The 6K4 and CK608 have a cathode emitter and use 6.3 volts, which more or less prohibits their use in receivers due to the extra weight of batteries needed. The balance of the tubes have filament emitters and use 1.5 volts for heating.

Fig. 9 shows the thermal relay mentioned earlier in this article. The author's original model measured 3/8" x 5/8" x 1-1/2", weighed less than 1/4 oz. and featured a device for holding the points open after they had been actuated. This completely opens the ignition circuit, thus saving batteries and coil. The contacts may be reset by releasing a small spring. This unit is pictured in center of Fig. 15.

Figs. 10, 11 and 12 give an example of



Fig. 12
This tiny transmitter (compared to size of half dollar at left) operates on 165 mc.

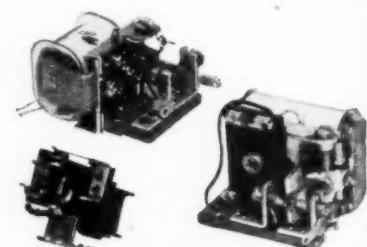


Fig. 13
Various commercial sensitive relays



Fig. 14
Experimental "freeband" transmitter



Fig. 15
Some weight-saving R.C. components (for comparative size note circle of ten cent piece at extreme right)

what can be done in building miniature transmitters and receivers. Fig. 10 is a six-meter receiver using an RK-61 and measuring 3/4" x 3/4" x 1-7/8", exclusive of the tube. Weight with relay is 1-1/2 oz. Fig. 11 is a six-meter transmitter with a range of 3/4 to 1 mile. It uses the circuit given in Fig. 11A. Fig. 12 was just an experimental model of a transmitter operating at 165 mc. Sizes are shown as compared to a half-dollar.

Fig. 13 shows three of the sensitive type relays used in radio control receivers today. Above: Sigma type 4F; lower left: Kurman type 13C44; right: Sigma type 5F. The last mentioned is perhaps one of the most sensitive commercially used relays on the market, having a sensitivity of 5. milliwatts.

In Fig. 14 we have an exclusive photo of one of the new "free band" transmitters. This was an experimental unit and therefore shows a tuning adjustment; the production model will not have this. The complete transmitter and all batteries are carried in the case, which measures 2- (Turn to page 51)

by JACK FLORENZIE

HERE at last is flying as you want it. This small model is an original design that can be built on the bread-board and flown in the neighborhood park—yes, this style of flying will thrill that blood that has been cooling with the type of flying we have had to do in the past. With the engine run timed beforehand, the ship is placed on the ground and in a few seconds it is on its way and in the air—truly a pleasure after watching some of the “madmen” at contests heaving monsters into the air to get the most out of the limited engine run. The *Shrimp* was designed primarily to carry the new K & B *Infant* glow plug engine. We predict the *Infant* will give free flight the shot in the arm it needs. Here is flying at its best!

The plans have been made full size, so no enlarging will be required. The pages upon which the plans are printed will lie perfectly flat, and you can build right over them if you wish. Lay a sheet of wax paper over the plans to keep the cement off the magazine.

To start construction, select soft balsa which will keep the framework weight down; the covering can then be a little heavier. This will save a lot of work later on if the model lands in a tree. Lay out the fuselage, and in order to get the two sides alike, one can be built atop the other. When dry, remove from the plans and insert the crossmembers. Cut the keel pieces and cement in place along with the firewall. Bend the landing gear, cement in place, and bind with thread. Fill in the sides at the nose as shown and sand the entire job, then re-cement all of the joints well for added strength. Carve the cowl to fit the engine. Since glow fuel is to be used, it is best to paint the entire nose of the ship with Testors' *Hep*; this is not harmed by the glow fuel as is regular dope.

You will note that two different noses are shown on the drawing, a long one for the *Infant* and a shorter one for the O. K. CO₂. If you expect to fly the ship with more than one powerplant you can make several detachable noses, as the plans indicate. The nose in use is positioned on the fuselage by the block of 1/4" thick balsa, and held in place with a rubberband on each side.

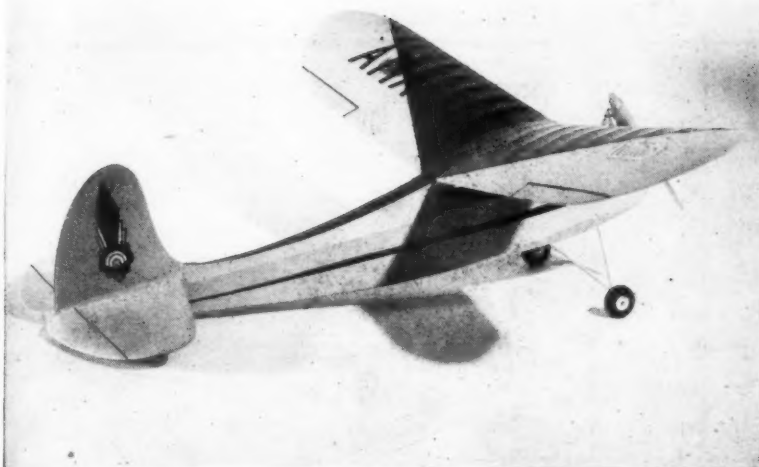
The tail assembly is next and is cut to shape from soft balsa and sanded to shape as you would form the wing of a hand launched glider. Sand smooth and cement in place, checking to see that it doesn't warp while the cement is drying.

The wing ribs are cut from hard balsa to keep them from warping; it is best to use C stock for these ribs if you can get it. Cut the wingtips and trailing edge and cement them in place, over the plan along with the spar. Then, cement in the ribs, cut the wingspar gussets from hard balsa and cement to the spar. This will establish the required dihedral which should be 2" under each tip. Add the leading edge along with the trailing edge to finish up the centersection. Sand the wing and if there are any loose joints, cement well, and the wing is ready to cover.

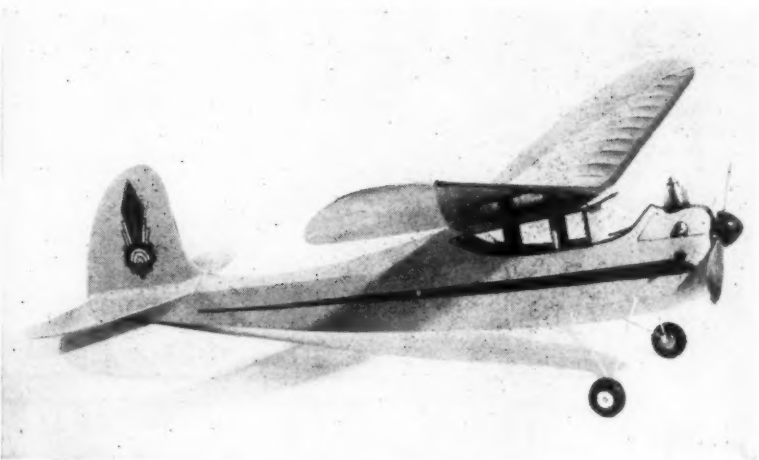
Add a little castor oil to the covering dope as this will prevent the dope from pulling the wing out of shape, and will give the model a nice shine.

The best way to make preliminary tests is to glide the ship and adjust with small weights at nose or tail until it does not dive but glides flat and without

(Turn to page 54)



The SHRIMP



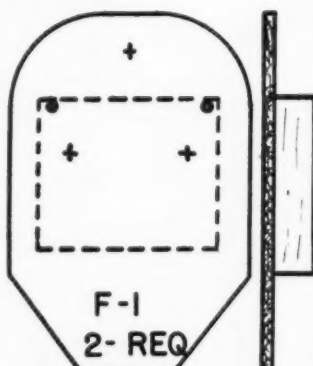
A new era in I. C. powered models has been started by the *Infant* — build a *Shrimp* and join the fun!



NOSE COWL HELD
IN PLACE WITH
RUBBER & DOWEL.

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WEIGHT OF MODEL
1 OZ. LESS ENGINE.

• INFANT - MOUNTING
+ O.K.³ CO² "



K.&B.⁵ O.K. CO²
.020

COWL SOFT
BALSA

F-1-1/16"
PLYWOOD

BALSA
W-1

GUSSET

W-1 1/8"

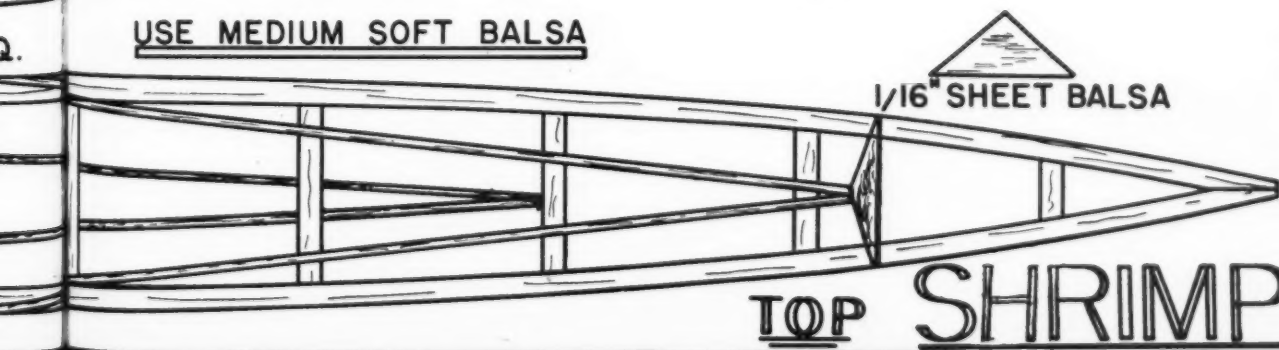
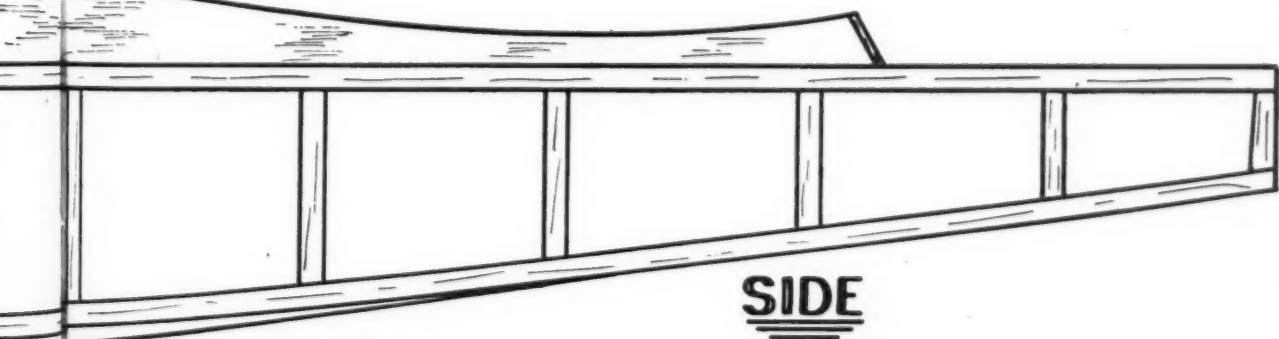
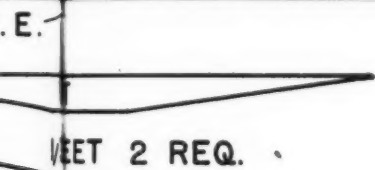
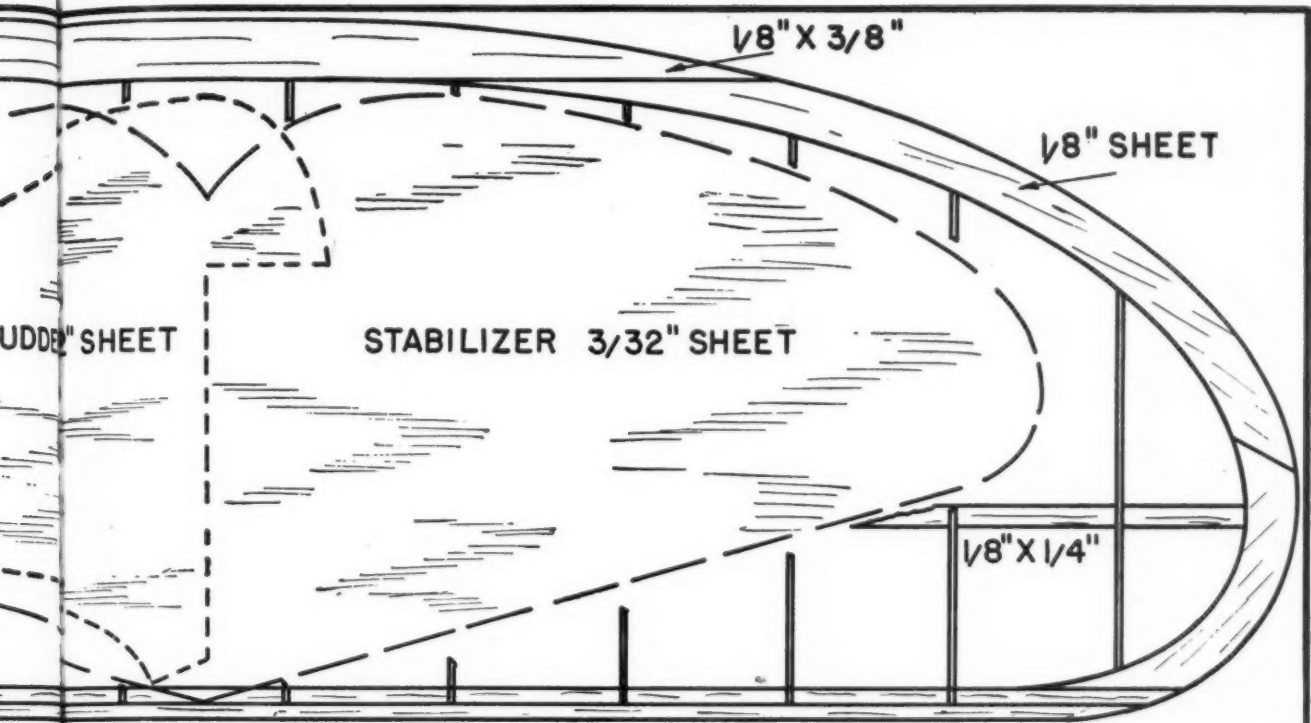
5/32" SQ. L.E.

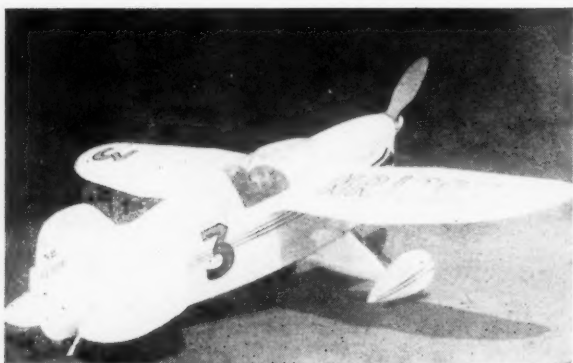
1/8" SQ.

1/32" SHEET 2 REQ.

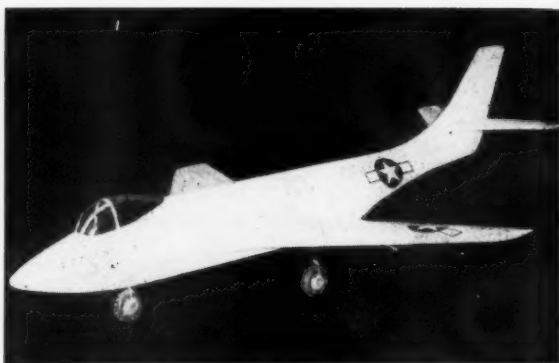
WHEEL TREAD 5"

RUDDER

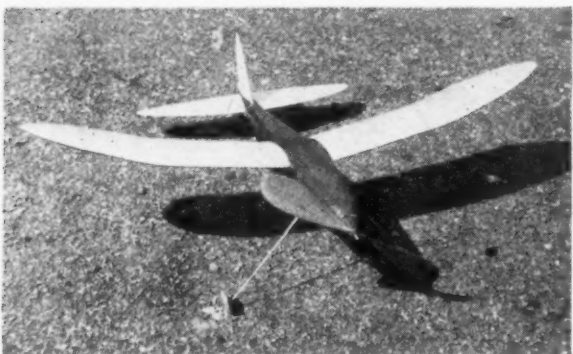




No. 1 Wayne Denny's scale control line model of the Chester Jeep



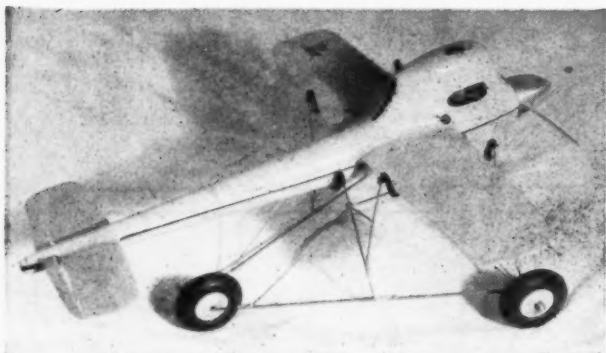
No. 2 Dyna-jet powers this McDonnell XF-88 by James Taylor



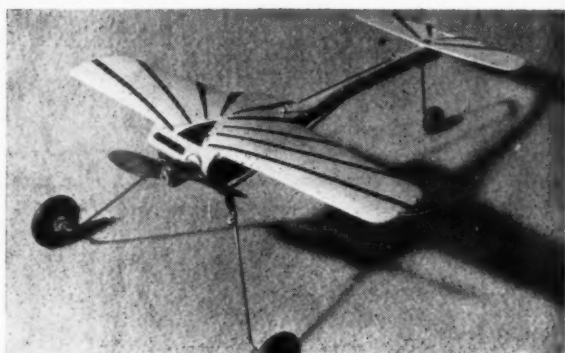
No. 3 An original Wakefield design from V. Dubery, England



No. 4 Don Golarneau has great hopes for this Brooklyn Dodger



No. 5 Slick speedster by N. Sher has McCoy 29 power



No. 6 Another speed design named the Flounder by Kent Mercer

AIR WAYS

NEWS OF MODEL AIRPLANE EXPERIMENTERS FROM ALL OVER THE WORLD

NEW RULES. Each year at this time the subject of rules is an important one to all contest fliers. The 1949 AMA Contest Rules have been announced and we present a brief survey of the various categories. Changes from 1948 rules are:

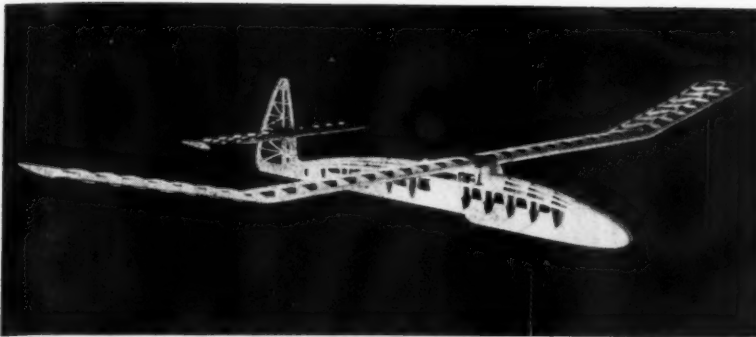
Outdoor Rubber and Gliders: Cabin models must ROG. Towline length increased to 200 ft. Contest Director must provide towline. **Indoor:** No changes. **Free Flight Gas:** No changes. **Control line Speed:** Lines must be .001" per 2 oz. of plane weight. Line lengths to be 52-1/2 ft. for Class A, 60 ft. for B, 70 ft. for C & D. All record flights to be flown outdoors.

Control Precision: Fixed retractable landing gear required (no dollies or hand launch). Appearance and flight points changed. Special maneuvers must be done by the plane—not by flier. Jet models may fly in Precision, Novelty and Flying Scale. **Control line Novelty:** No changes, except as in Precision rules. **Control line Flying Scale:** Fidelity and workmanship points changed. 15 pts. added for presenting authentic 3 view of big plane. 15 additional pts. for presenting actual working plans of model.

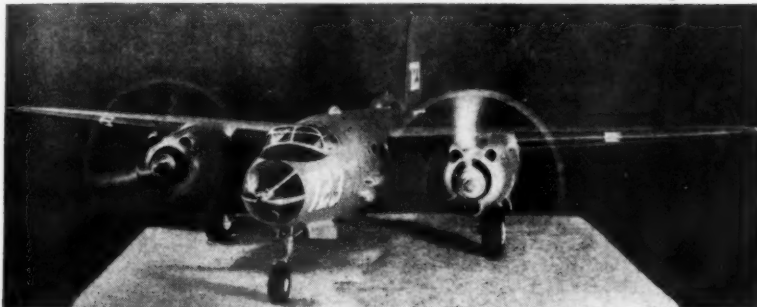
The new rules will be written up in booklet form, to include all Radio Con-

trol, Precision and Novelty Control line, and Scale Control line and Free Flight rules; this booklet will be printed just as soon as final votes are received from Contest Board members on some questions that were not settled on the first ballot. These include the idea that some restrictions should be placed on establishing records (eliminate Record Trials, recognize only those records made at AA or larger meets etc.), and the problem of changing speed flight timing procedure. As soon as these controversial issues are decided we will announce the results.

1949 WAKEFIELD TEAM. AMA Wake-



No. 7 This design is called the Stork by builder J. V. Ribeiro de Almeida of Portugal



No. 8 Over 1000 hours was spent by Paul Nock on this exhibition scale Martin B-26



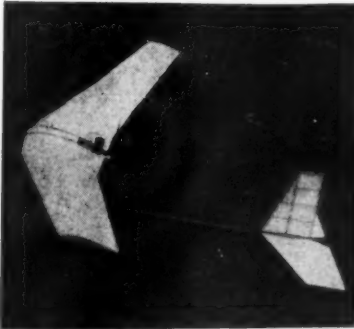
No. 9 J. Lindenchal and modified Gollywock



No. 10 Two favorites held by F. Blumenthal



No. 11 John Rawlings with his Grumman F3F-2



No. 12 F. Mamrol calls this ship Prop Saver

felt and he wrote us a bitter letter setting forth his own local problems in this line. Mr. Wells feels there exists the makings of an outstanding club in the Bristol area, but he tells us that the local experienced fliers refuse to assume any responsibility; the club has the usual quota of officers and leader members, but everything seems to be left to Mr. Wells when there is work to do. The club has a local service organization as sponsor, but the sponsoring group has been of little help.

An AA meet that was scheduled by the Bristol Aeromodelers last summer appeared doomed to complete failure, and was only saved at the last moment by Bill Lehman and his Bucks County Federation who gave Wells the needed help.

It is a sad fact that this problem is not confined to Bristol or to Pennsylvania. It is nationwide, as Don Warner will surely attest. We urge the more experienced modelers to take a little time out from flying and lend their support and knowledge to their local associations. And we further urge these same modelers not to accept club offices or leader memberships if they are unwilling or unable to fulfill the duties that these honorary positions make necessary.

CANADIAN ASSOCIATION. Late last fall a meeting was held in Toronto of delegates chosen by model builders from all over Canada, to form a governing body for model flying in Canada. As a result, the Model Aeronautics Association of Canada was formed and was delegated by the Royal Canadian Flying Clubs Association as the official governing body of model aeronautics in Canada, with full F. A. I. Authority in all model matters.

The MAAC will function along the lines of our AMA and will issue model licenses. Clubs and individuals may obtain full information from Secretary James W. Graves, 1555 Church St., Windsor, Ontario.

MAAC expects to sponsor the Canadian Nationals this year in Toronto, probably in August. We are asked by MAAC President Lavalie Walter to request through these columns that all holders of Canadian National Perpetual Trophies please write the secretary.

With the increasing interest in scale control line racing, our No. 1 picture this month should strike a responsive chord. This is of course the famous Jeep used by Art Chester in many prewar races. The model, built by Chuck Mathews to a scale of 1"=1', has an extremely fine finish and Art Chester, who has seen the model, says it is the nearest to scale of any he has encountered. This little job travels between 80 and 90 mph and is powered with a McCoy 36. Wayne A. Denny (425 Platt St., Long Beach 5, Calif.), member of the North Long Beach Thunderbugs, sent us this photo and tells us that the model is used in the West Coast scale type U-control races.

No. 2 shows a 1/12 full size McDonnell XF-88 Voodoo fighter built by S. D. Matteson and James Taylor (219 Day Dr., Ferguson, Mo.). Because the model was built to exact scale, the control surfaces were found to be inadequate for proper control and the ship was damaged on its first test flight. The Dyna-jet engine is completely enclosed and the system of insulation and fuel feed that was worked out functions quite satisfactorily. The fuselage is entirely covered with 1/16" sheet balsa and the jet unit is mounted inside a double cylinder of asbestos sheet, with an air space between the two layers of

(Turn to page 42)

field Committee Chairman Frank Zaic announces that a more equitable method of picking the 1949 Team has been worked out. All modelers who wish to try out for a team place are asked to advise AMA Headquarters before April 1, sending along \$1 with their registration. Records will be kept of geographical distribution of entrants, and where necessary special elimination events will be set up to accommodate these entrants. It is hoped, however, that qualification events can be run off in conjunction with regional meets all over the country, making special Wakefield eliminations unnecessary.

The dollar fees collected from entrants will go to defray costs of any such special meets, if they are needed. Funds remaining will go towards expenses of sending the Wakefield team to England. Since it is certain the funds will be insufficient for this purpose, it is urged that individuals and groups strive to obtain sponsorship for local qualifiers.

HELPING HANDS NEEDED. After reading of the unsuccessful efforts of Don Warner to establish a statewide model club association in Florida, President Clarence Wells of the Bristol (Pa.) Aeromodelers could see just how Don

Save That Battery

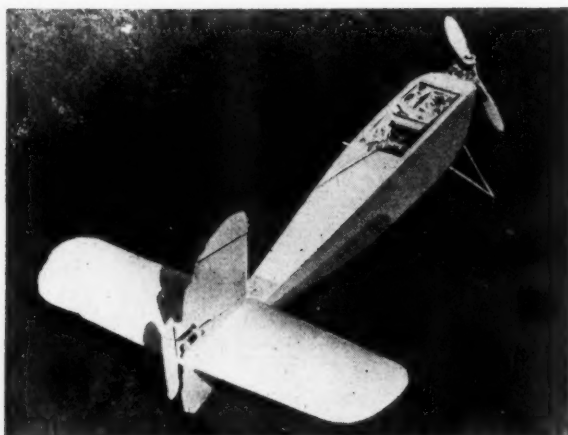
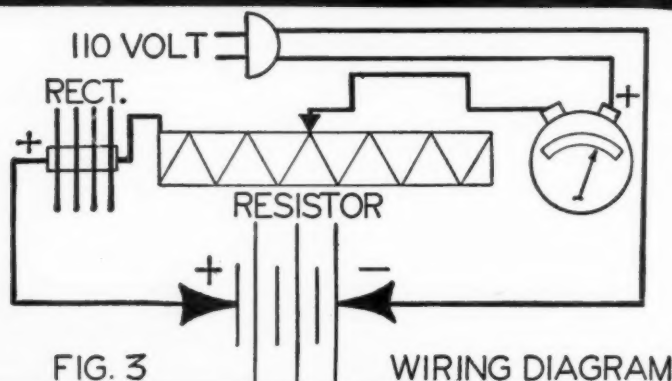


Fig. 1 This small fuselage carries several sets of "recharged" batteries

by H. H. OWBRIDGE

"Dead" batteries are not necessarily worthless—try rejuvenating them

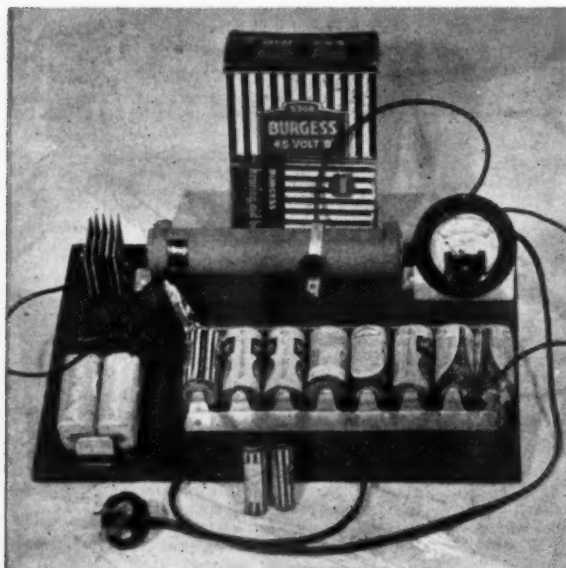


Fig. 2 The charger, shown with various batteries it will pep up

MANY a drycell battery has been pronounced "dead" and discarded when actually it has only accumulated an excess of hydrogen around the carbon electrode. In model airplane work we estimate that 80% of all batteries are discarded after only a small percentage of the active material in them has been used. Whenever a drycell is put in use, hydrogen bubbles collect on the carbon electrode. This is called polarization and it increases the internal resistance of the battery and reduces current flow.

A de-polarizing mixture is used in all carbon-zinc batteries to dissolve the hydrogen. This mixture (the black stuff) is usually made up of crushed coke, graphite and manganese dioxide. Zinc chloride is also added to help preserve the battery while it is not in use. This de-polarizer can only work so fast. In many uses to which these batteries are put (such as flashlights, doorbells, etc.) this rate of de-polarization is fast enough to keep up with the hydrogen that is formed during the short period the battery is in use. In model aircraft work high current drains are used, and the de-polarizer doesn't get enough time to dissolve all the hydrogen. The battery is discarded long before the active battery materials have been used up.

The internal chemistry of drycells is not simple and need not be understood. However, for those who may be curious it goes something like this: $Zn + 2NH_4Cl + 2MnO_2 = ZnCl_2 + 2NH_3 + H_2O + Mn_2O_3$. In words it sounds even worse, but don't worry, you can still charge that battery.

The ideal operation of drycells calls for intermittent use, or very low current drains if used continuously. Under these conditions the zinc container (negative pole) will be well used up when the battery shows signs of wearing out and hence the battery is not re-chargeable. Most drycell users consider battery cost so low that charging is not worthwhile. Companies that buy large quantities of dry cells pay even less per cell and so have less to gain for the time and equipment it would take to re-charge. Then, too, the charging of dry cells is not as routine and automatic as the charging of lead-acid cells (car batteries). Charging drycells is a de-polarizing process rather than an electro-chemical reversing process. Only a very small part of the dry cell charging process is due to chemical reversibility. And there are admittedly some reactions that go on inside drycells during charge that are not thoroughly understood. Consequently some drycells react differently than others (as will be described) and charging requires a little first hand experience and attention to be successful.

In the hobby of model aircraft—and especially radio control—the cost of batteries cannot be considered negligible and an inexpensive charger can soon pay for itself. For example, the radio controlled ship shown in Fig. 1 has a battery installation worth about \$3. These batteries have all been charged on the average of six times. That would be \$18 if the art of re-charging were not known. If we had had to pay that price there just wouldn't be any radio controlled ship. This example should show why the battery companies are not affected too much by the practice of charging. The more use that can be obtained from a battery, the more batteries will be used.

Of course, in radio control one man's experience with battery cost will differ from another's by the amount of his activity and other factors. In the past two years of Rudevator development, our battery bill would have been high (without charging) since we more or less kept two transmitters, three powered ships and two sailplanes operating. Then, too, in the "early days" we had to feed experimental models of Rudevator

(Turn to page 36)

Dealers!

Johnny Clemens
suggests



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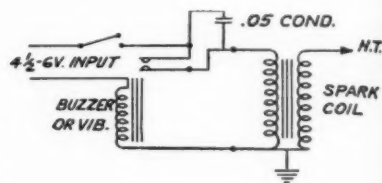
JET IGNITOR

By B. G. Hanst

THE increasing interest in jet engines has brought about the problem of a suitable and convenient means of supplying a continuous spark to the jet in order to start it. Ford vibrator spark coils are used whenever they can be obtained, but we give you here a simple hookup that utilizes most of the parts the gas model builder has on hand.

For this unit you will need a model airplane spark coil (Aero, Smith, Modelectric, etc.), a condenser, an on-off switch, wire, alligator clips, and a 6 volt buzzer vibrator or doorbell ringing assembly. The hookup shown in the drawing is self-explanatory, but we shall give a step-by-step explanation of construction.

A small board about $\frac{1}{2}$ " x 3" x 4" can be used for mounting all the parts. The primary of the spark coil is connected in series with the buzzer assembly. In this way, as the current through the buzzer is interrupted, the current through the spark coil will also be interrupted. Connect the condenser across the points of the buzzer, or vibrator. A ground wire, 18" to 24" long, is connected to one end of the spark coil and an 18" to 24" length of heavier wire is used for the high tension lead. Connect alligator clips to the free ends of these wires to facilitate their connection to the engine. The



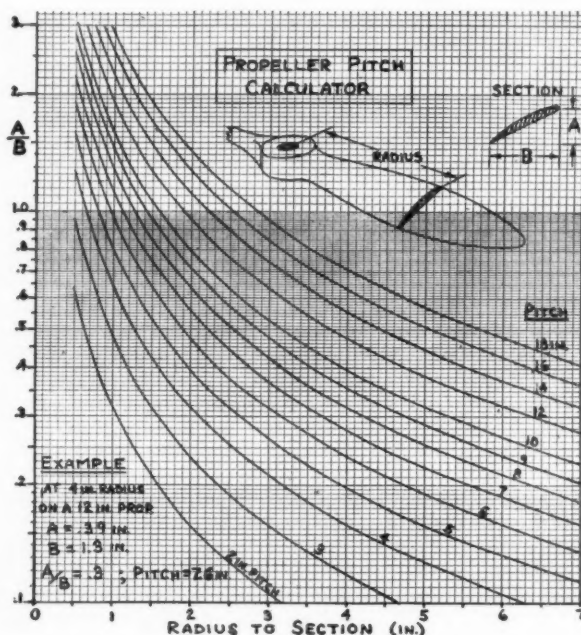
on-off switch is placed in one of the battery leads leading to the coil or buzzer. For efficient operation, keep the high tension lead as short as conveniently possible. Should there be excessive sparking at the points of the buzzer, increase the size of the condenser from .05 mfd. to .1 mfd.

This whole unit may be placed in a small box to protect it from dirt and fuel, then taped to the side of your battery. Generally, $4\frac{1}{2}$ V. will be sufficient to operate this unit; however, a 6 V. hot-shot battery will not harm the spark coil, since it is in series with the buzzer. It must be remembered that the voltage required for the unit will depend on the voltage needed to operate the buzzer or vibrator unit.

DO NOT OPERATE this unit without a spark gap for the coil, otherwise an excessive load is placed on the fine wire of the spark coil secondary. Play safe and connect the ground and high tension leads to a spark plug when testing the unit.

PROPELLER PITCH CALCULATOR

By Fred R. Youngren



HERE is a little graph that you will want to clip out and paste in your model scrapbook. With it you can check the pitch of your favorite propeller at any station along the blade. Just determine the three measurements as shown in the sketch (notice that dimension A is to the center of the leading edge); at the intersection of the A/B ratio line and the radius line on the graph you will find the propeller pitch given in inches. Through use of this chart it

is possible to carve your own propellers with constant or variable pitch along the blade. For U-Control flying a constant pitch propeller should yield best results, while for free flight it may be advisable to increase the pitch near the tips. Since there is no information available on model propellers with varying pitch along the blade, this will open up a new field of experimentation for you. It will be easy if you use the Propeller Pitch Calculator.

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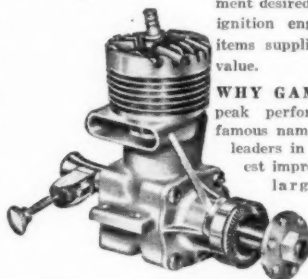
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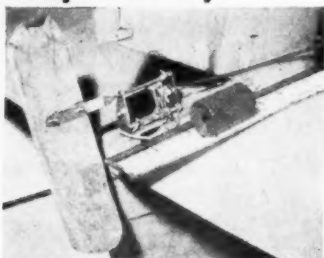
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Save That Battery

(Continued from page 32)

plenty of battery power to assure reliability. The production design is not so greedy, but then we expect to be in this sport for many years and the charger is really paying off.

The charger described in this article (Fig. 2) was designed for simplicity first, low cost second, and all other factors last. Efficiency is of little importance since the energy used is much less than an ordinary light bulb requires.

Three major components are needed as follows:

1. The selenium rectifier. This is a half wave No. 5Q1-D7, 250 ma *Seletron*. Obtainable from the Radio Receptor Company Inc. in New York City or your local radio dealer. Many Ham stores sell them for as much as 40¢ off list. Price will run about \$1.50 to \$2.50.

2. The limiting resistor. This is a Clarostat K-100-WA, 2000 ohm 100 watt adjustable resistor. *Dividohm* or other make just as good. Obtainable from Clarostat Mfg. Co. Inc. in Brooklyn, N.Y., or local dealer. Price about \$1.20 to \$2.00. Order heavy duty slider with it—about 30¢.

3. The meter. This is a Shurite Model 550, Stock #5310, 0 to 300 ma. Obtainable from Shurite Meters in New Haven, Conn., or have your local dealer order. Price about \$1.30. A plenty good meter for the purpose.

lenium rectifier circuit may wonder why it is not necessary here. The battery acts as its own capacitor and always produces the higher voltage at the rectifier necessary for charging. Because of this the setting of the resistor is not always the same for a given voltage battery but varies somewhat depending on the capacity effect of the size of battery or group of batteries being charged. Hence the meter for ease of adjustment.

The components are mounted on a 10" x 12" board which is used to arrange simple clips or terminals for the smaller size battery groups to be charged. We use mostly medium flashlight cells for standardization. Fig. 2 shows almost all the batteries we normally charge. All these batteries are not charged at the same time, of course. Use test clips to transfer from one battery setup to another. Secure all wires that need not be moved, to prevent shorts.

A WORD OF WARNING

It would cost much more to make this charger shockproof. Don't bother to enclose it—that won't help. Place the charger on a remote part of the bench, or provide a separate shelf for it. Make sure little sister can't touch it. Don't let it get cluttered up with miscellaneous articles. Always pull the plug from the light socket before touching the charger.

TABLE OF APPROXIMATE CHARGE RATES

Battery or Group	Approx. Chg. rate—mils	Time Hrs.	End Voltage	Approx. Chg. volts across battery
1 Pen cell (penlite battery)	50 to 100	1/6 to 1/2	1.6 to 1.8	1.6 to 2.0
8 Pen Cells (in parallel)	100 to 150	1/6 to 1/2	1.6 to 1.8	1.6 to 2.0
1 medium flashlight cell	100 to 150	1/4 to 1/2	1.7 to 2.0	1.8 to 2.1
8 medium flashlight cells (Fig. 2, in parallel)	150 to 300	1/4 to 1	1.7 to 2.0	1.8 to 2.1
1 large flashlight cell (size D)	100 to 200	1/4 to 1	1.7 to 2.0	1.8 to 2.2
8 large flashlight cells (in parallel)	200 to 300	1/2 to 1 1/2	1.7 to 2.0	1.8 to 2.2
2 smallest hearing aid B (22 1/2 volt) (in series)	5 to 10	1/4 to 1	46 to 49	50 to 65
Next largest size hearing aid B (Fig. 2) (in series)	10 to 20	1/4 to 1	46 to 50	55 to 70
6 ounce B (shown in Fig. 2)	15 to 25	1/4 to 1	47 to 50	55 to 70
3 volt ignition booster	200 to 300	1/2 to 3	3.1 to 3.5	3.5 to 4.5
1 1/2 volt transmitter A (doorbell size)	200 to 300	1 to 4	1.6 to 1.8	1.6 to 2.2
45 volt transmitter B (largest in Fig. 2)	100 to 250	1/2 to 2	46 to 50	55 to 75
67 1/2 volt xmtr. B (estimated)	100 to 200	1/2 to 2 1/2	66 to 75	70 to 85

The selenium rectifier is rated at 1/4 amp. on a 95° Fahrenheit summer day. A little overloading won't hurt it as long as it is not enclosed where it can't cool. One side is marked +, which goes to the plus side of the battery. The resistor was chosen as a compromise for simplicity. Actually a combination of two or three resistors could be used at nearer full capacity. But only a few cents could be saved and the charger would become more complicated. The resistor is rated at 100 watts but is rugged and will stand considerably more. However, when the slide adjuster is placed in the center, the part of the resistor being used has a rating of only half, or 50 watts; with the adjuster at the quarter point, 25 watts and so on. So don't set the adjusting tap much closer than one inch from the left end of the resistor wire or the remaining wire may run too hot. Also, don't set the adjuster too tight or the resistor wire may be damaged. Only a light contact is necessary. The meter is the inexpensive iron vane type and accurate enough for the purpose. The pointer will try to follow the A.C. ripple but this doesn't hurt it. If you are a radio control operator, your present meter shunted up to 300 mils will do until the resistor can be marked by experience for each type of battery. However, the permanent meter is inexpensive and makes it easier to find the proper setting of the resistor for any group or size of drycell.

Wiring the charger is very simple as shown in Fig. 3. Those who are used to seeing a capacitor across a half wave se-

Make this a habit. Adjust the plug so that it is loose in the socket and can be removed quickly if necessary. Never leave the charger on overnight. Charge batteries while doing other work in the vicinity. Actually there's nothing that will jump out and bite you, but use your head. You're better off afraid. Don't lean on a water faucet with one hand and touch the charger with the other. A shock across the fingers of one hand won't hurt you but from hand to hand could make Mother wonder why you're late for dinner.

Now for charging batteries. A lot of it is trial and error but there really isn't much chance for error. It's pretty difficult to actually ruin a battery unless it's the very small 22 1/2 volt hearing aid type. These small B batteries use what is known as pancake construction. Flat wafers of zinc and carbon lay against each other. Too fast a charge rate will allow gas to separate the wafers and open circuit the battery. However they often close again on cooling. Some have been re-closed with slight pressure in a vise. Use a piece of wood to prevent a short circuit around the vise jaws.

Generally speaking, the battery charge rate depends on the battery size and weight. Single or multi-cell batteries with large individual cells should be charged at a rate that will only raise their temperature until barely perceptible to the hand. Hearing aid B batteries should not be allowed to warm up more than is barely perceptible to the lips. A good rule here is to adjust the charge current to not

more than one or two times the normal drain current. Large batteries can take a lot more. Start low and read the battery voltage (pull that plug first) every ten minutes or so at first until experience is gained. The table gives approximate charge rates, time, and typical end voltages to expect. Hard and fast rules for charging drycells just don't exist. Naturally a battery that shows (by sight or thumbnail test) holes or thin spots in the zinc can should be discarded. However, some of our best flashlight batteries have been those in which electrolyte has leaked out all over the place.

Batteries of different manufacture vary slightly as to treatment required. It simplifies things always to buy flashlight batteries of one make for easier comparison. We're not sure which make is best for re-charging. It seems that the metal-sealed type will take more of a beating since they don't crack open so easily when charged at an "impatient" rate.

Sometimes a battery won't take a charge. But if set aside and given another chance it works fine. No one has an explanation—gremlins maybe. Some say to let the over-voltage come down before putting the battery in use. We can't see any difference. Above all, don't let anyone tell you that the high voltage reading is just a bunch of stuff, or that drycells just can't be reactivated. We had a pair of hearing aid B batteries at the Nationals that we couldn't use because they were up to 50 volts and refused to come down under load. Not having the heart to short them down to 45 volts, we re-installed a couple of old batteries that had been charged several times and read "only" 46 volts under load.

Before using a charged battery, it should be load tested. Sometimes a battery will show a good no-load voltage, but under load it will drop sharply. This doesn't happen too often but is worth checking for. We have a small push button switch built into our homemade meter box that puts a 10 ohm load across our flashlight batteries while we are reading the voltage. A successfully charged medium size flashlight cell to us would show about 1.8 volts when removed from the charger and would not drop below 1.4 volts with the 10 ohm load. This rule is only rough and subject to a wide margin due to personal experience. Don't test B batteries this way. Use the transmitter or receiver load to determine their condition under load.

Another reason why batteries last longer with charging is that the battery seems to deteriorate badly if used in a depleted condition. Keeping the battery voltage up apparently increases its useful life just as it does with lead-acid storage batteries. We charge our small hearing aid batteries 3 to 6 times before discarding. They never go below 44 volts and more often read 47 volts under load. Our low voltage batteries (ignition, Rud-elevator and filament) start out in use at anywhere from 1.7 to 2.0 volts but soon come down to 1.5 or 1.6 because of the heavier loads. Our transmitter A and B batteries need charging only about once in three or four months and are used until the zinc cans break thru. Our first set lasted a year and a half, and part of this time was B. C. (before charger). The second set we expect to last longer. We often take a set of newly purchased batteries and give them a short charge just to "wake them up" from their shelf life. We don't use wet cells but there's no reason why you can't charge them with the unit described here. Try it.

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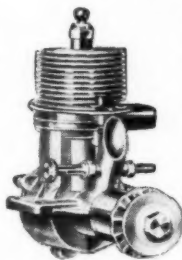
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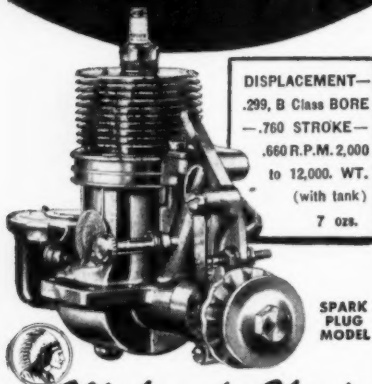
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Design Forum (Continued from page 13)

In other words, it creates forces that loop or turn the plane over on its back. Now supposing we have a plane such as in Fig. 2B with the thrust line, and therefore the weight of the engine unit high in the structure. In this case gravity W pulls downward to the left of thrust T, producing a couple which noses the plane over to the left. It generates forces that tend to nose the plane back into level flight and to resist excessive stalling.

If you are looking for duration, the plane with the high thrust line is the better bet because such a ship will climb steadily at a steep angle without stalling, looping or rolling on its back and otherwise executing altitude-losing maneuvers. If a proper arrangement of thrust line and CG is established you will have one of the most stable planes during a climb that you can imagine.

Many of these points were originally suggested by the performance of models in flight. Then they were thoroughly tested with many models to determine the accuracy of the theories. In other words, these conclusions are not taken out of thin air but are the result of more than thirty years experimenting with all types of model planes.

* *

We can not neglect our Canard fans this month. Many readers have shown interest in this type of model, and well they may. It is not too much to say that Canards can out-perform tractors provided as much thought and careful designing is given to this type. Philip F. Peterson of Milwaukee, Wisc., writes: "My knowledge of Canards has now reached the stage at which I feel justified in building CO2 powered models for further study. Can you suggest suitable airfoil sections for these models?"

Yes we can, and also provide other helpful hints. The general specifications for a Canard should be: we will discuss a contest model. First start with the span of the rear wing which we will say is 36". To give an aspect ratio of 9 for efficiency, a chord of 4 1/4" is advisable. This gives a wing area of approximately 148 sq. in. when wingtips are rounded. The area of the front (or small) wing should be approximately 1/3 that of the rear, in this case 50 sq. in. The aspect ratio of the front wing should be about 1/2 that of the rear, or 4 1/2. A 16" span and 3 1/2" chord will give this aspect ratio and the required area when the tips are rounded. The front wing is given lower aspect ratio for a definite reason. When the plane is climbing and slows down as it approaches the stalling point, the air passing over the front wing spills out of the tips more than with the rear wing. This is due partly to the lower aspect ratio and partly to the large dihedral angle commonly used.

The dihedral should be approximately 18° to 20° on each half wing. This "spilling" of the air reduces the lift of the front wing relative to the rear. Consequently, the nose of the airplane drops and the plane again assumes a normal flying angle. In other words, the feature of low aspect ratio and large dihedral contributes greatly to the model's longitudinal stability.

On single propeller Canards, the front wing should be raised above the thrust line a distance equal to about 2/3 the front wing chord and should be set at about 3° angle of incidence. The rear wing may be set at 1°. To insure spiral

stability and general steadiness in flight the high forward lateral area must be offset with a fin or fins extending downward beneath the wing. This produces a low center of lateral area (CLA) at the rear keeping the CLA of the whole airplane in a lowered position.

The front wing should be well forward of the rear one, not nearer to the rear wing than half the span of the rear wing. This distance may be even as much as 60% or 70% of the span. The diameter of the propellers of single motor pushers should be about 40% of the span. 15" is a good figure for a 36" span. If exceptionally fast climb is desired, a 14" prop may serve the purpose. Sometimes greater steadiness in climb results from smaller props and longer frames. The longer frame allows a greater length of rubber motor to compensate for the smaller prop, in rubber powered models. We suggest you use the Grant X9 wing section on all contest planes.

Fig. 3 shows an excellent side view arrangement of a single-propeller Canard. If you build your next Canard like this you will be astounded at its flight.

To illustrate what fantastic designs can be made to fly successfully as control line models, and which would be entirely unsuitable for full scale aircraft, look at Fig. 4A. This weird ship has only one wing, yet it flies very well. The center of gravity is located approximately as shown in the figure CG. The center of lift is out on the wing farther than the CG, at point L. This produces a force arrangement shown in the front view, Fig. 4B.

Note that the lift pulling upward and gravity pulling downward are not one above the other. As you might expect this force arrangement tends to roll the plane over to the right in the direction of arrow R. However, it is restrained from rolling by the pull of the guide wires G. These pull at a slightly downward angle and cause a rotation in the opposite direction, arrow Q. In other words force S, which is the horizontal component of the pull on the wires, balances the centrifugal force C. The downward component D of the wire pull, balances the downward pull of the weight W, about the point CL, at which the lift force acts. In this case the lift L must equal the sum of downward forces D and W. This downward pull of the wires at the wingtip makes it possible to fly such a fantastic ship.

* *

Jerome L. Rivers of East Orange, N.J., is interested in building a ship similar to the one shown in Fig. 4 of November "Design Forum." We can tell you truthfully that this type of ship will give you a great thrill. One was designed and built some time ago and its performance was most unusual. It was extremely steady and fast.

Mr. Rivers wants to know what type airfoil should be used. We suggest one similar to that in Fig. 5. There should not be much positive undercamber. In fact, a downward camber is best because it helps reduce the center of pressure movement which is so essential in flying wing types. Where the elevators form part of the airfoil the trailing edge should be turned up slightly as shown so that in normal flight the elevators have an angle of approximately 1° to chord line C of the airfoil. A good fineness ratio—that is, airfoil thickness relative to chord—is 1/12. In other words, distance H should be 1/12 of chord CC'. The attack angle

(Turn to page 40)

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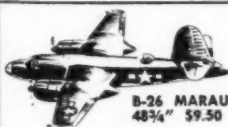
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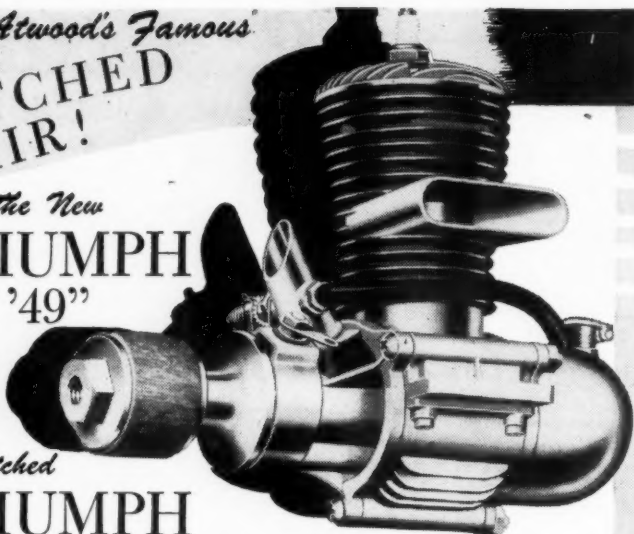
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of such a wing should be approximately 1°, with a washout of 1° at the wingtips; that is, the wingtip chord should be 1° more negative than the wing root chord, or 0°, (chord of the wing where it joins the body). This procedure insures that the wingtips will lift more relative to other parts of the wing at high attack angles. The lift on the wing, therefore, moves back toward the tips at high angles and tends to lift the rear of the wing and reduce the attack angle. The reverse takes place when the attack angle decreases. Instead of lifting, the wingtips create a downward pressure so that the center of lift moves forward to lift the depressed nose. In this way the center of pressure movement is automatically regulated to produce stability. Fig. 5 shows the rearward position of the center of lift, L1, resulting from the wing nosing up. L2 represents the forward position.

Mr. Rivers is evidently getting to the point in his aviation research where he will have use for a wind tunnel. Possibly he wishes to test some of his own airfoils because he asks where he might obtain the use of a tunnel in the neighborhood of New York. There is an excellent one at New York University and we suggest that he contact the Dean of Aeronautical Engineering.

Don't forget to write about your problems to "Design Forum," MODEL AIRPLANE NEWS, 551 Fifth Ave., New York 17, N.Y.

The Polly Glider

(Continued from page 17)

fine film. Either pin it in place on the fuselage or omit the pins and block the stabilizer and body up so it will dry in place. A thin fillet of cement is added on each side of the stabilizer next to the body. The rudder is then cemented on, using the same method of blocking the fuselage to insure correct alignment on drying.

WING. An honest effort should be made on constructing the wing if satisfactory results are desired. No attempt is too arduous when cutting dihedral breaks and beveling them, or cementing the wing together properly. The wood should be carefully selected from semi-quartered 4-1/2 or 5 lb. stock. The leading edge should be materially heavier, as compared to the trailing edge. A full quarter grain is not desirable as it will shatter on hard impact. It should be noted that the finished glider without clay weighs 3/4 oz., which means excess weight should be avoided wherever possible. The wing should therefore be a light part of the glider. I generally plane and sand the airfoil section before cutting the wing outline; in this way a margin of error is available on the tips. The high point of the airfoil should be 25% from the leading edge. The wing is then worked down to a very thin trailing edge.

The entire wing is completely sanded before any dihedral breaks are cut. It is then cut into four sections, the two centersections assembled first. The dihedral at the midsection is very low, and the bevels not difficult to cut. I usually hold the wing firmly against a square work board and sand one way with the sandpaper block at the estimated angle of bevel. After both sections have been bevelled off check for proper dihedral, which will be 1/2". They are cemented together with a thin film on each surface, pressed hard by hand, then laid on proper blocks to dry.

The two tips are then bevelled, and



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when this is finished the centersection should be ready for sanding. If care is taken the center joint will not loosen at this stage, and each tip can be cemented on. The tip dihedrals on right and left side should be checked against each other to insure similarity; this should be 1-1/2". The wing is left to dry standing on its leading edge and blocked up. I have found this system useful in prevention of drying accidents which are common. When the wing joints are reasonably hard, a cement skin is applied over each break, upper and lower surface, except in the center where the wing joins the fuselage. Apply the cement very thinly and cover a surface 3/4" over each break. It can be applied and feathered by spreading on with one finger. Each joint should have a minimum of 3 such thin coats of cement, allowing sufficient time in between for drying. This can be done after the wing has been joined to the fuselage, pinned and cemented in place.

A minimum of 4 coats of cement should be applied as fillets to hold the wing on, and should cover the same area as the breaks. A throw tab on either wing can be cemented on at this stage. This is usually triangular in shape, tapered towards the front and rounded near the trailing edge. If possible it should extend slightly beyond the edge.

FINISH. Every modeler has his own particular method for finishing, and I certainly make no claim that this is the best. I can only say that it is superior to anything I have ever tried, and adds little weight. I employ a soft camel hair brush and sanding sealer, applying the first coat by brushing both ways. A total of 3 or 4 coats can be used for high ceiling performance, but each coat should be care-

fully sanded, removing every bit of gloss with No. 400 paper. Removal of gloss is the only way a mirror-like finish can be obtained with a minimum of weight. The finished product should be rubbed with waxed paper or any paper having a very smooth finish. I believe this is a matter of choice as I have had equal success with a number of rubbing agents. One or two very light coats of sealer are enough on the tail surfaces, as the addition of more will make them brittle.

TESTING AND FLYING. The glider should be carefully balanced two-thirds of the way back of the leading edge by adding day to the nose. It will probably be tail heavy, but left turn is added slowly until the right balance is determined with the desired circle. It should be launched gently a few times, increasing the throw strength until the glider climbs level and banks into its left turn. If it does not show a nose heavy attitude it is safe to grasp and throw it hard in whichever manner the modeler is accustomed to. The method I use is a firm body grip with the index finger behind the left wing. A slight amount of washout in the right wing may be required to prevent a premature left turn. One thing is certain: a very hard launch is required to attain the altitude at which this glider will pull out decently.

As stated before, no effort can be too great if satisfactory results are required. Don't forget, the *Oakland Cloud Dusters* have been building Polly gliders for two years and each one has been more or less an experiment. The results however are gratifying in view of the times made, records held, and above all the self-satisfaction of building and flying a star performer.

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Air Ways

(Continued from page 31)

asbestos through which cooling air from the wing scoops is ducted.

The graceful Wakefield model in No. 3 was intended as a compromise between the usual British and American styles of design. V. Dubery ("Oakwood Lea", Ellen Close Gardens, North Lane, Leeds 8, England) writes that the model is quite small, with a low aspect ratio and a wing section patterned after an Eifel 431, which is quite similar to the Grant X-8. Though the model turned in some good flights, it was found to have insufficient spiral stability for reliable flying especially in the rough English weather and was later abandoned for the large conventional English streamliner. Specifications on this model are: wingspan 40", airframe weight 5.2 oz., rubber weight 3.2 oz, prop 17" dia. by 25" pitch.

An old favorite shows up in our next photo, No. 4, which is a copy of Sal Taibi's *Brooklyn Dodger*, built by Don Galarneau (7117 N. Seward, Portland, Ore.) and intended simply as a sport model for prac-

sent in by Jose V. Ribeiro de Almeida (R. do Nogueira, 472, Oporto, Portugal). Named the *Stork*, the glider has proven a fine performer and turns in consistent flights of 2 to 3 minutes with a 34' towline and without thermals. Stability is excellent and the ship has never spun. It has a 5.3' wingspan and the aspect ratio is 13.3. Several types of wood were used including balsa and four native varieties. Fuselage is covered with blue silk while the wings are bamboo paper covered. The builder gives us a brief idea of model flying in Portugal: As with many other places in the world, model materials are very scarce and prices extremely high. For example, a kit for a French motor sells for about \$64, while sparkplugs cost several dollars apiece; as a result there are few gas model enthusiasts in his country, most fliers contenting themselves with gliders. Since the balsa that is available is of a very poor grade, the so called hardwoods such as pine, bass and poplar are widely used.



Members of Southmost Hobby Club, Brownsville, Texas, look over a few entries for their February "Charro Days Contest"

tice flights. However, test hops turned out so well that it will probably be used for contest work. The powerplant is an *Orwick 23* which proved to have ample power to pull the 40 oz. ship upward in a big hurry.

A sleek design by N. Sher (1322 Morris Ave., New York 56, N.Y.) is shown in No. 5. Mr. Sher doesn't give us many details of this model aside from the fact that it is powered by a glow plug *McCoy 29* and has a fuselage of sugar pine; the wings and tail are of laminated balsa and plywood. Total weight is a little over 1 lb. At the time this photo was received, poor weather had prevented many test flights.

The novel little ship in No. 6 is called the *Flounder* by its builder, Kent Mercer (913 Bryant Ave., New Hyde Park, L.I., N.Y.). He found that the sidewinder design enabled him to attain 25% more speed than he could reach with a conventional ship using the same motor. A *McCoy 29* was used in this case, and the model's construction is all balsa with a total weight of 13 oz.

Photo of No. 7, a glider framework, was

The beautiful built-up scale model in No. 8 can easily be recognized as a *Martin B-26*. It was constructed from a *Cleveland* kit with many modifications, including shock absorbing landing gear, and propellers which are powered by rubberbands for exhibition purposes. The ship has a span of 50", and well over 1000 hrs. was spent in construction. Builder Paul Nock (19 Ten Eyck Ave., Albany 7, N.Y.) has been constructing models for 20 years.

De Witt Blossom (Freeport, N.Y.) of the *Freeport Model Association* sent us No. 9 showing one of the members, J. Lindenthal, holding his modified *Gollywock*. This model, incidentally, was lost out-of-sight on its last official flight at a club contest. Mr. Blossom tells us that his association flies all types of models and the average membership age is 16, most of the members being new to the game.

Frank Blumenthal sent us No. 10. Here we see him holding two of his successful models; in the left hand is a *CO2 Powerhouse* which he believes holds the Canadian record for *CO2*. Competing at the

Canadian Nationals he had rather bad luck with the rubber job, which he is holding in his right hand, but ran up an official total time of 11:48 with the *Powerhouse*. The first unofficial test flight at the meet showed a time of over 9 min., but of course this could not be counted.

The smiling young man in No. 11 is John Rawlings who is carrying his scale Grumman F3F-2 which was built from plans made from some of Bill Wylam's original masterplans in M.A.N. The ship has a wingspan of 45", with a planked fuselage and conventional two spar wings, and a complete set of flying and landing wires. The landing gear is made as close to scale as possible and constructed of brass rods so as to be full shock absorbing. The model weight, including a 30 minute fuel supply, is 4-1/2 lbs. To control time of flight and landings, a third line throttle has been installed, and in the photo a 13-8 prop was fitted to the Viking 65 engine. This prop was found unsatisfactory because of excessive torque. William L. Kincheloe (7439 Wayne Ave., University City 14, Mo.) sent us this picture.

It is easy to see why Francisco Mamrol (3854 N. 19 St., Philadelphia, Pa.) calls his ship, which is seen in our last photo (No. 12), *Prop Saver*. A high lift wing is used with the pusher-type *Ohlsson 23*. The tail is a piece of aluminum tubing on which the flat tail surface is fastened. The ship has a very flat glide. It was first found to be spirally unstable and, as Mr. Mamrol puts it, "This allowed the model to increase its bank dangerously thus lowering its nose into a graveyard spiral." The defect was completely corrected by adding tissue covering to the wing mount under the engine. Another slight difficulty showed up in that the engine heats up excessively when the airplane is not in motion. This makes it necessary to launch the model immediately on starting the engine.

NEWS OF MODELERS

PEN-PAL SEEKERS: Phil Andrews, 62 Lebanon Court, Twickenham, Middlesex, England . . . William Archer, 7 Alders Rd., Benchill, Manchester, England . . . Adrian Bryant, 9 Ewing St., Lismore, Australia . . . E. W. Dyer, 35 Crescent Way, Norbury, London, S. W. 16, England . . . John A. Bennett, 96 Lyttelton Ave., Blackheath, Birmingham, England . . .



Irving Walk, Bronx, N.Y., packing in turns. This model placed second in meet of *Scream'n' Demons*, a win that helped him gain the Long Island Championship Trophy

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EXCHANGE MAGAZINES, PLANS, ETC.: Brian D. Pavodi, 137 Nimrod Rd., Streatham, S. W. 16, London, England... Edgar W. Dutton, 43 Clifton Grove, Clifton, Rotherham, Yorkshire, England... Henry J. Nicholls, 308 Holloway Rd., London, N. 7, England.

SPECIAL REQUESTS: Geoffrey Eastough, 104 Shobnall St., Burton-on-Trent, Staffordshire, England, tells us that about a year ago he began a correspondence with four persons through our "News of Modelers" column but lost contact with them. Now he is eager to pick up where he left off with those modelers... S. H. Clark, 2 Bridge St., West Bromwich, Staffs, England, Hon. Sec. of the *West Bromwich Model Aero and Car Society*, writes that he would like to correspond with a model club in the States and is also willing to exchange English diesels.

CLUB NEWS

California

The *Los Angeles Thermal Thumbers* announce a Wakefield Team contest to be held May 22nd. Only teams composed of 5 members will be accepted. Entries must be made by March 12. Simply send in the names of team members to Lon Salisbury, 2507 Calif. St., Huntington Park. No entry fee for those under 18 years of age, but members will be charged 50c each. Wakefield rules will be strictly adhered to, and winners will be determined by the highest total of all 15 flights by each team.

Here are results of the *Fresno Gas Model Airplane Club* monthly contest held Nov. 28: Class A—Fritz Mosier,

8:25.4; B—Robert Doig, 21:27.2; C—Jack Tiftick, 5:38; D—Ronald Mosier, 8:58. *Juniors*—Robert Doig, 21:27.2. Dick Beggs was Contest Director, with Ocie Randall in the starting circle watching and supervising the takeoffs and checking times.

Illinois

Aurora Aeronuts elected these officers for 1949: Pres., Maurice McEvoy; Contest Director, Harry Kelly; Sec., Dave Mann; Jr. Vice Pres., Owen Richards and Ronald Schwiesow; Treas., Hart G. Betts. The *Aeronuts* look forward to 1949 being as successful a season as 1948. Mr. Betts, in charge of club Public relations, would like to have other club secretaries in Northern Illinois, Southern Wisconsin and Eastern Iowa contact him on their schedule for 1949 to prevent a conflict in contest dates. Address: 7 Fox Promenade, Aurora.

Kentucky

Seems everyone is holding elections for officers; here are officers of the *Louisville A. B. C. Model Club*: Pres., Art Strobl; Vice Pres., Stanley Brenner; Jr. Vice Pres., Jimmy Green; Sec., Leonard (Icay) Joseph; Treas., Harvey Green. The club has been studying the merits of various blanket insurance policies to protect its members in case those whizzing speed jobs or race cars should cause injuries or property damage. Present plans call for early purchase of such a policy and Norman F. Robinson, who wrote us about this, wonders if any other clubs have taken similar action.

New Jersey

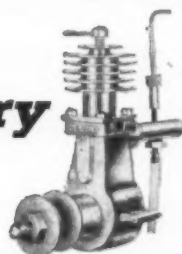
Union Model Airplane Club sent in these election results: Pres., Nick Klym; Vice Pres., James A. Hunt; Sec., Ronald Denk; Treas., Fred Domkos, Sr.; Sergeant-at-Arms, Douglas Denk. They are sponsored by the Recreation Dept. of Union which has given them a meeting room, rent-free, and a private flying field with a 40' asphalt takeoff strip. The Mayor and other town officials are highly enthusiastic about model flying and support the club wholeheartedly. Since the club is town-sponsored, only persons who reside in Union are eligible to fly there.

George Akers of Great Bend, Kans., with his B-26 at the K. C. Model Manglers meet. The ship has hit 65 mph under urge of two Ohlsson 60's



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New York

Sometime in February the *Hot Heads* are holding an indoor contest for A.M.A. members. Interested model builders may obtain further information by writing to Contest Director Eddie Luca, 130-85th St., Brooklyn 9, or telephone SHore Road 8-8305.

The *Flying Bisons* are working on their contest scheduled for June 19—to be known as the Second Western New York Controline Championships. The *Bisons* plan to have all classes of speed flown, as well as combined stunt and a flying scale event. Contestants will fly in the novice and expert classifications instead of the conventional Jr., Sr. and Open. Each will designate the class into which he belongs by merely signing his entry blank as "Novice" or "Expert." A Novice is considered to be a flier who has not won any prizes above third place in the past contest season; an Expert is one who has placed third or above in any contest during the past season.

Ohio

One of the neatest club papers we have seen is the *Rubber City Aeronauts' PROP WASH*. Editor R. E. Baughman, 2345 13th St., S. W., Akron 14, requests the services of members to act as reporters so that a good coverage of Akron and the neighboring area may be had. The goal is to have a reporter for each section of Akron—how about some volunteers? Incidentally, the *Aeronauts* celebrated their 2d anniversary on Jan. 5. Congratulations and best wishes for a long life and many successful flights!

Here are the results of the Dec. 12 Indoor Model Airplane Contest sponsored

by the Cleveland Women's Chapter National Aeronautic Assoc. in Central Armory, Cleveland. (Age divisions: 8 to 12 yrs.—Beginners; 13 to 16 yrs.—Jr.; 17 to 20 yrs.—Sr.; 21 yrs and over—Open.) *H-L Gliders* Beginners—Jay Doty 19.3; Jr.—Spud Kohler 26.2; Sr.—Paul White 28.2; Open—R. Obarski 39.8. *R. O. G. Stick & Fuselage* (for Beginners & Jr. only) Beginners—William Ward 2:32.8; Jr.—John Humphreys 2:48.0. *Stick* (superfine paper, or microfilm models) Jr. & Sr.—Al Chute 6:44.4; Open—Don Mamay 7:36.2. *Cabin* (superfine or microfilm models) Jr. & Sr.—John Humphreys 2:56.3; Open—Dick Fox 6:56.6. Just wonderful cooperation was received for this Meet. Col. Bassett at the Cleveland Airport offered trophies, medals, theatre tickets, cash prizes, plus 24 airplane rides for all the winners under 16 yrs.! (Many thanks to Mrs. Red Hillegas for this report.)

Secy. Gene Osborne of *Hobby Haven Model Flyers* in Chillicothe, writes that his club now has 25 members; most of their activity is in U-control but there is also interest in free flight, rubber and towline. Meetings are held on 1st and 3d Tuesdays of each month at Hobby Haven shop; flying is done on a softball diamond, and the club hopes to have a new circle this summer.

Oregon

Eugene Prop-Spinners held their 2d Anniversary party in the Recreation Center building December 14. Paul Price acted as M. C. and introduced the 35 members and families present. Plans for their first '49 contest are underway and they hope to hold it May 15. Everyone, naturally, is welcome.

IMPORTANT

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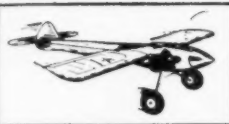
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Argentina

The model airplane season in Argentina was climaxed by a Meet last October which apparently corresponds with our American Nationals. The top prize competed for was the President's Trophy. Gas model flying was run off in three classes, the largest being Class C which included engines ranging from 4.91 to 20.5 c.c. displ. There were 81 entrants in this class and almost without exception all the motors were American types. Winner of Class C was Ricardo R. Martinez who flew an original design powered by a McCoy '49. Class B included motors from 3.27 to 4.91 c.c. and was won by Manuel Gulam, flying an Ohlsson 23. Class A, which included all motors under 3.27 c.c., was won by Carlos A. Fernandez. In this class there were many foreign diesel motors; the winner used a Movo D2. (The meet was held at Campo de Merlo).

South Africa

Hon. Sec. R. Patrick Wheeler of South African Model Airplane Club tells us membership is now 25, and that a large meet is planned for Easter. The problem at the moment is travelling, their best airdrome being 23 miles out of town. The only English kits at all popular are those featuring rubber power; the rest are, of course, American. Dave Abbott introduced a so called Championship scheme which functions on a monthly point basis. All members are awarded a specific number of points every month for each type of activity in which he participates, such as flying, attending meets, timing, building new models (per month), breaking records, etc. At the end of their fiscal year the highest point holder is the "champ." A trophy and present are the prizes.

Miss Los Angeles

(Continued from page 11)

to the builder's discretion, however, the model having been designed with more than enough strength to get by well without it.

The first step in construction is to enlarge the plans. This operation requires pencils, eraser, ruler and, if possible, proportional dividers and draftsman's curves. Wrapping paper of store variety is a reliable surface on which to work.

FUSELAGE. It was desired to maintain simplicity of structure throughout while still incorporating a high degree of fidelity to scale, great strength and lightweight, as well as securing ease of operation and maintenance of the components. A vertical split cowling for the engine provides a smooth appearing yet readily accessible covering of the powerplant. Through use of slots at rear of the cowl high engine operating temperatures are prevented.

It will be noted that the engine is completely cowled, except for the operating mechanism and the necessary exhaust outlet. If you want to retain this feature, choose an engine that will fit the space available. We found that a sideport Ohlsson 23 fitted in very nicely.

The top rear half of the fuselage is completely removable to permit ready access to the operating units. These in turn are as conveniently arranged as the weight factor allows.

Mark off the lengths between fuselage formers by measuring directly from the plans onto two hard balsa strips of equal size, which act as longérons.

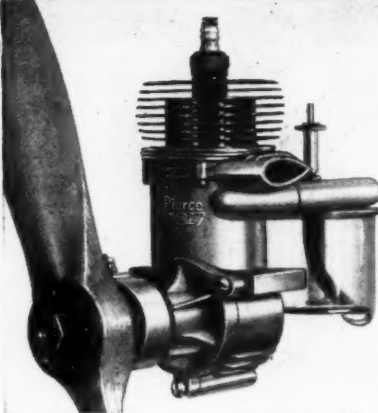
First cement the rear of these together; then, working from rear to front, insert

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the fuselage formers in their predetermined positions. Following their drying, attach the lower keel strip, wing fairing block with its plywood mounting ribs and the fuselage stringers. From tough, springy steel wire fashion the wire landing gear to shape, binding the connecting joints of the two legs with thin copper wire followed by solder. Install this in its illustrated position with thread binding and a generous amount of cement.

If the builder plans to install wire bracing on his model he should attach the wire studs with a wire and solder binding as shown.

At this time mount the rubber-tired wheels solidly between soldered washer retainers. The laminated sheet balsa wheel pants may now be formed and installed; then in a like manner position the strut fairings. A 1/64" break is maintained where the strut meets the fuselage to allow for future absorbing of landing shocks without splintering the fairings.

A weak point on many scale control line models today is the landing gear. Either it is structurally inadequate to meet the rigors of flight or it is so far from scale appearance that it is a liability to the model's beauty. Here we have tried to correct this defect and from all indications have succeeded.

From a solid medium-hard balsa block prepare the top fuselage cover using a try and fit method to secure a smooth fitting joint. The vertical fin is glued into place and the entire unit sanded smooth in preparation to covering.

The tail wheel fork is bent to shape and installed with thread and cement binding. The wheel is permanently affixed between two soldered washers.

Further construction on the fuselage should be halted here and resumed later, as the text will indicate.

WING. Medium-hard balsa will be used throughout this portion. First cut out the ribs and tip pieces from their respective sizes of sheet balsa. Working directly over the drawings, lay out the wing outlines and follow through by inserting the ribs. When thoroughly dried, remove the assembly from the plan and insert wing spars into their respective positions. Planing of leading edges with the proper material comes next.

The wing flaps themselves are carved from solid block balsa to the illustrated pattern and sanded smooth. Attach wing panels to the main fuselage structure by inserting the spars into the slots exposed in the stub ribs. After placing the required degree of dihedral in each panel, apply cement to the joining rib and spar. Use a thread binding on the spar and former joint to secure a strong mounting.

With plenty of cement, attach the three tubes for the control lines. Sandpaper these surfaces in preparation to covering them.

EMPENNAGE ASSEMBLY. Since the vertical fin has been previously constructed the only remaining portion of this component to be built up is the rudder. This is accomplished by fashioning it from sheet balsa and attaching it to the main fuselage structure.

The stabilizer is formed as a single piece; after it has been cut from sheet balsa it is cemented into place.

The elevator surfaces are also formed from sheet balsa and attached to the hardwood dowel joining piece. For further clarification of this, consult the drawings.

CONTROL & IGNITION HOOKUPS. At this time the elevator actuating connections should be installed. First install



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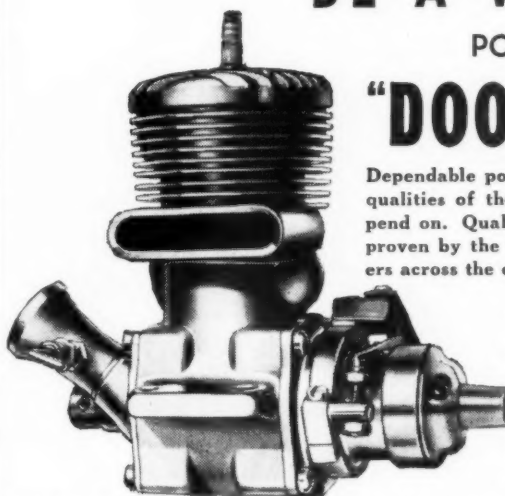
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Designed for Sport and Stunt. Finger Tip Adjustment—No Screws, Bolts, Nuts—Tailored to Fit the Hand—21 Strand Steel Cable Leaders—Ends Pre-tinned—Absolutely Will Not Slip!

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Test & Break-In Stand. Safest means of mounting your engines—fully adjustable—engine cannot pull out while revving up.

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the roller and its base, fastening most solidly. Next comes the rod hook-up between roller and elevator. Thread stranded control line cable through one inlet in the wingtip, wrap and affix it to the roller assembly, then thread it back through the remaining inlet tube.

The gumwood motor mounts may now be installed as well as the ignition coil, battery box and ignition timer.

The simple wire arrangement for operating the wing flaps is then positioned. Reference may be made to the drawings for any assistance one may need in carrying this out. Adjust the wire guides to have the landing flaps fully lowered a few seconds before the timer breaks the ignition circuit. Thread fish line through to act as the timer pull line in much the same manner as that used in installing the control wire.

With sparing use of adhesive, spot cement the fuselage top cover and the engine cowl in place. Finish with varying grades of sandpaper, from coarse to fine, and prepare the entire model for covering and finishing.

COVERING, FINISHING & ASSEMBLY. A fairly heavy mixture of clear dope and cement makes the ideal mixture for sticking the wet, heavyweight Silkspan to the structure. By use of the wet covering system a far more beautiful job will result.

All portions of the model are covered, not only to provide a smooth surface over the porous balsa but to increase the strength and resistance to splitting, abrasion, etc., that unshielded balsa has. After applying two coats of clear dope over the Silkspan surface, sand it smooth with fine granite paper.

Five thin coats of flaming red dope are next put over the entire model, brushing each coat crosswise to the previous one and sanding well between each coat. The entire trim of the model is done in gold and best applied through use of a gummed cellophane called "Zipatone," or through use of stencils. At this time a hand rubbed finish may be applied for those who are willing to expend a little extra effort. A very fine grain rubbing compound with a thin oil base, followed by several thin coatings of well worked polishing wax, will entirely change the whole appearance of the model.

If it is desired to have the wire wing bracing incorporated in your model, it should be attached at this time.

Install the engine and complete the ignition hookup. When you have attached the celluloid windshield the model is completed.

FLYING. The subject of control line flying has been covered to such an extent that all participating in it should be fairly well acquainted with the fundamental principles involved. It may be stated, however, that this model is by no means sluggish on control and has all the speed and maneuverability one would care to handle.

With a little smooth handling that comes with practice, your Miss Los Angeles will undoubtedly be one of the most interesting models at any competition event or flying congregation.

The Eight Ball

Despite its name, *Eight Ball* is a very successful free flight design for engines in the .19-.23 sizes. Designed according to AMA Contest specs., we believe there will be many winning *Eight Balls* this coming season. Complete plans will be found in the April issue of *MODEL AIRPLANE NEWS* . . . On Sale Everywhere March 8th!

'49 NATIONALS ANNOUNCED!

MODELERS who attended the 1948 Nationals at Olathe, Kans., will be overjoyed to learn that the 1949 event will be held at the same spot. And those modelers who didn't attend had better start making plans now, for we are promised a Meet that will top even last year's outstanding 17th!

Official word, just received as we go to press, states that the Meet will be held from July 26 through July 31, at the huge Naval Air Station just outside Olathe. Joining the Navy again in sponsorship will be the Olathe Chamber of Commerce, and Earl Collier Post No. 153 of the American Legion. These three groups will direct the Meet through the same men who did the job last year, and who now have an invaluable fund of experience to draw from.

An expanded program plus a few special Navy surprises, make it necessary to lengthen the meet an extra day. The sponsors are preparing to handle over 2000 contestants, and from the reputation they gained through the highly successful 17th Nationals, we feel their optimism is fully justified.

Local AMA officials from President C. O. Wright on down are enthusiastic and promise even more personal help than last year; they will also invite model specialists from many parts of the country to help them.

This Meet really promises to be a honey! Full details will appear in coming issues of this magazine.

What's the R.P.M.?

(Continued from page 15)

luloid or similar plastic to prevent soiling.

USING THE STROBOSCOPE. Use of the stroboscope is extremely simple and straightforward. The reflector is pointed toward the moving machine or part. The instrument is switched-on and is held as closely as possible to the machine. The instrument may be held in the hands or may rest on the bench, table or ground near the machine under study. Best results will be obtained, of course, in a darkened area, since the light flashes from the stroboscope cannot compete with sunlight or strong artificial illumination. Satisfactory results often may be obtained on the model airplane field by seeking a shaded area, such as might be found under or on the shady side of a box, wall, bush, or building.

If the operator desires only to observe the operation of a rapidly moving machine or part, rheostat R₁ is adjusted to bring the machine to an apparent dead stop. Various features then will be visible, such as bending of parts, slipping, weaving, vibration, etc.

If it is desired to determine the speed of the machine, in addition to observing



"Well, it looks like Wanda has finally cracked the sonic barrier!"

Four Star Model Builders SUPPLY

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K&B Infant .02 disp. \$7.95	Arden 099 \$12.50
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Red, Yellow, blue only 2 sheets for 15c	

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Pea Wee Clips, ea. 10c	010, 012, 014 and 016 140' 65c
Spark plugs, state size 50c	Veco Air Wheels, per pair 2 1/2" 2.15, 3 1/2" 2.50, 4 1/2" 2.75
Austin Timer 1.50	Sponge Wheels, Alum. Hubs, 7/8" per pr. 20c; 1 1/8" pr. 30c; 1 3/8" pr. 50c; 2 1/8" pr. 60c.
Battery Box, 19. 1.25	Flotorque Props, 8" 35c
Med. or Sm. 0.40	Hibal Props, 8" 14" 35c
Mounting Bolts 4/10c	Top Flite Props, 8 to 14" Dia., 3/16" to 1/2" pitch 35c
Flexible Needle 1.25	
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Airflo Wedge Tank. 1.00	
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Music Wire, 3 Ft., 020 & 030, 3c; 035 & 040, 4c;	

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McCoy 19 engine—Glow \$9.95; Ign. \$10.95
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STRIPS	SHEETS
1/16 sq. 1/4 35c	1/4 sq. 1/4 35c
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1/16x1/8 1/2 70c	1/4x3/8 7c
1/16x1/4 2c	1/4x3/4 8c
1/16x3/8 2 1/2c	5/16 sq. 5c
1/16x1/2 3c	3/8 sq. 6c
3/32x1/8 1c	3/8x1/2 8c
3/32x1/4 2c	1/2 sq. 9c
3/32x1/2 2 1/2c	3/4 sq. 15c
3/32x3/8 3c	1/2x2 16c
3/32x1/2 3 1/2c	3/8x2 20c
1/8 sq. 3 for 5c	1x3 .55
1/8x1/4 2 1/2c	1x6 1.10
1/8x3/8 3c	2x2 .80
1/8x1/2 4c	2x4 1.25
5/32 sq. 1 1/2c	2x6 1.80
3/16 sq. 2c	3x3 1.50
3/16x1/4 3c	3x6 3.00
3/16x3/8 3 1/2c	4x4 3.50
3/16x1/2 5c	4x6 4.25

Beveled balsa trailing edges, 30" lengths	
3/32x3/8 3c	5/32x3/8 5c
1/8x1/2 4c	3/16x3/4 6c

Propeller Blocks	
8x7/8x1/32 6c	1-3/4 18c
10x1x1/2 10c	Glider Wing 9x1-1/2x2 18c
12x1x1/2 12c	Section 10x2x2-1/4 25c
14x1-3/16x 16x1-1/2x2 26c	3x3/16x20 18c

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RADIO CONTROL EXPERIENCES

The story of the 1948 Nats Radio Event, as viewed through the eyes of a contestant, will give all prospective R. C. fliers an idea of what they should plan for during the coming season. What size and type of ship to build, what the top winners used at the 17th Nats, plus helpful suggestions in conducting an R.C. meet, will interest all modelers engaged in this branch of miniature aviation. Study this helpful information in the APRIL issue of MODEL AIRPLANE NEWS . . . out March 6th!

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McCoy "29".....19.50	Little Cut-Up.....2.95
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its dynamic behavior, read the figure from the calibrated dial of rheostat R₁ at the point where the machine seems to stand still. Take care to avoid harmonics, or multiples of the true speed.

The stroboscope is invaluable for studying various forms of motion. Its use is not restricted to rotating machinery. Vibrating and reciprocating mechanisms, for example, also may be observed under the flashing stroboscopic light.

PARTS LIST (Circuit diagram)

- B-225-volt battery (5 Burgess Type W30BPX 45-volt radio B batteries connected in series)
- C₁-0.5 ufd. 600-volt tubular capacitor—Cornell-Dubilier DT 6P5
- C₂-0.001 ufd. mica capacitor—Cornell-Dubilier 1W 5D1
- C₃-0.05 ufd. 600-volt tubular capacitor—Cornell-Dubilier DT 6S5
- R₁-2500-ohm 10-watt wirewound resistor with slider—Int'l Res. Co. Type AB
- R₂-2-megohm 1-watt carbon resistor—Int'l Res. Co. Type BT-1
- R₃-25,000-ohm 1-watt carbon resistor—Int'l Res. Co. Type BT-1
- R₄-100,000-ohm volume-control-type rheostat with switch—Int'l Res. Co. Type CS
- S-Single-pole, single-throw switch supplied as part of R₄

ADDITIONAL PARTS REQUIRED

- 1-4-prong shell-type above-chassis tube socket—Amphenol Type ACS
- 1-Strobotron tube—Sylvania Type 1D21
- 1-Bakelite knob—I. C. A. No. 1156
- 1-5-inch polished metal reflector—See Text
- 12-1-lug insulated terminal strips—I. C. A. No. 2434
- 24-6-32 1/4-inch, round-head machine screws with nuts
- 4 feet—Stranded, insulated radio hookup wire
- 1-Case. Minimum outside dimension 12" x 9" x 5"

Flash News

(Continued from page 5)

about 1/4 as much weight as it did or, conversely, the XC-99 can now operate from airports with runway strengths of only 25% that required by its earlier gear. The giant transport, which can carry 400 fully-equipped troops, will continue to undergo extensive tests including long range flights. The first of these will be a San Diego-Wright Field flight which, while no great distance, will provide valuable fuel consumption data. If the C-99 was available in production quantities, each of them could replace seven Douglas C-54 transports now used in the Berlin airlift!

THERE IS NOW no question but what Great Britain has the "bit in its teeth" in the gas turbine transport field. Not only have they flight tested one two-jet and one four-jet plus one four-turboprop airliner, but British Overseas Airways Corp. has placed a production order for 25 Bristol 175 airliners powered by Bristol Proteus turboprop engines. These airliners, which will actually not begin operation until 1953, will accommodate 60 passengers during the day and 38 in berths at night.

FRANCE HAS developed about the oddest looking jet aircraft yet, which only shows that the tragic occupation of the recent war hasn't changed the habits of their airplane designers a bit! The S.N.C.A.C. NC 1071 is the first French multi-jet aircraft and is intended as a carrier-borne night fighter, torpedo-bomber and navigation trainer. What gives it its odd appearance is that the aft end of each engine nacelle is fitted with a vertical fin, and across the tops of these fins is a horizontal stabilizer! The theory of this odd empenage is that it clears the rear gunner mounted in the aft end of the crew nacelle. The huge craft (65 ft. span, 30,000 lb. gross weight) is powered by two Hispano-built Rolls-Royce Nene turbojet engines and is claimed to have a top speed of 470 mph and a ceiling of 43,400 ft. The NC 1071 made its first test flight successfully and production is scheduled.

THE MATING OF TWO of the oldest lightplane aircraft companies in the U.S. is scheduled as you read this. Purchase by Piper Aircraft of the Stinson Division of Convair has been announced with the price set at about \$3,000,000. The new company may be known as the Piper-Stinson Aircraft Co. if stockholders agree. While \$3 million sounds like a lot of money in the lightplane industry, actually the deal includes 375 Stinson Voyagers and Flying Station Wagons in storage which, if sold, would bring about \$2.5 million in cash. The remainder of the money is for tools, spare parts and various equipment for production of the two Stinson models. The available Stinsons will be sold at Willow Run where they are stored, and Piper hopes to be in production on a new model by the time these airplanes have been sold. Prototype of the new model, which features additional power, has been flying at San Diego for several months. Stinson began airplane production in 1926 and Piper established his firm in 1930 after being associated with C. G. Taylor in production of the famed Taylor Cub of the previous year. Reason for the move is Piper's long desire to get into the four-place field and Convair's desire to concentrate on "big plane" manufacture.

IT ALWAYS SOUNDS LIKE a company is making a lot of money when it gets a multi-million dollar contract from the Air Force, but Boeing Airplane Co. has revealed that actually it receives only 48c on each dollar of its military contracts, with 35c going to subcontractors, 10c to parts suppliers and 7c to raw material vendors.

WESTINGHOUSE HAS completed production on its 19B turbojet engine, after producing 130 of the small but powerful turbojet engines for the McDonnell FH-1 Phantom Navy fighters plus numerous guided missile installations. Production is now concentrated on the 24C turbojet unit, of which hundreds are on order for Navy jet aircraft, including the McDonnell F2H-1

Banshee, Vought F6U and the new Vought F7U Cutlass.

THE BATTLE BETWEEN radial and axial-flow compressors for gas turbine engines may soon end in a draw, according to Abe Silverstein, NACA powerplant expert. In his Wright Brothers Memorial Lecture he presented data on a dual compressor utilizing both types and stated this combination would be necessary if pressure ratios of 10 to 20 are to be obtained. Present ratios are 1.5 to 4. His compressor would consist of a number of axial-flow stages followed by two radial-flow stages.

IT MAY SOON be possible for a military aviator to climb in the cockpit of any type airplane and feel right at home. Although the cockpit standardization program has been the subject of extensive study for several years, Goodyear Aircraft Corp. has completed the design and construction of four standard cockpits for a fighter, a tandem bomber, a cargo plane and a long range bomber for the Air Force. The cockpits include complete equipment for all crew members of each of the types. Wonder if they'll ever apply this system to automobiles?

Summary of Radio Control

(Continued from page 26)

7/8" x 4-1/2" x 7-1/2". The name of the concern doing work on this unit cannot be given at this time, but in addition to their regular electronic product designing they are well versed in the needs of the radio control fan.

Some small components used in present day R. C. equipment are shown in Fig. 15, compared with a dime. At the left is an *Electrotor*, a new design of electric motor, useful for operating control surfaces, motor throttle, etc. through a gear train. This tiny P. M. motor operates on 3-6 volts and weighs 7/8 oz. Next is a tiny variable condenser, and following this, the thermal cutout diagrammed in Fig. 9. The heating coil can be discerned at the lower end of the unit; this coil is placed within the bend of the thermal strip. Lastly come two hearing-aid carbon potentiometers, one with and one without a knob.

And now for the latest word from the FCC. At present there is only one band on which equipment approval for manufacturers can be given. This is the much discussed Citizens' Radio Service Band of 462-468 megacycles. As mentioned in previous articles, tube difficulties (on the receiver end) are holding up the marketing of a unit for this band. Apparently this is being overcome, and we may see something really new in the very near future. There is available an experimental frequency of 27.255 megacycles, but no equipment approval is ready at this time. Input to the final stage, on this latter frequency, is limited to 5 watts (as compared to a class A-B station on 465 megacycles of 10 watts), and frequency tolerance must be maintained within .01% on the 27 megacycle band (within .04% is allowed on 465 megacycles). Pulse, audio, or frequency modulation will probably be allowed in both bands.

A bit of good news is contained in the fact that there is a company coming out with a complete line of radio control kits, information bulletins, and those hard-to-get parts, heretofore available only through manufacturers. Word has it that in addition to the catalog of hard-to-get parts, there will be plans and hints on radio control units and devices, to be issued at least once a month.

New developments of note are a self-neutralizing selector, being developed by

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Component Values for Circuits Given

FIG. 1A

- C1 40 mmfd.
- C2 250 mmfd.
- C3 40 mmfd.
- C4 1500 mmfd.
- C5 .01 mfd.
- C6 .005 mfd.
- R1 3900 ohms
- Antenna 12" to 30" long
- L1 3 turns 3/8" I.D. both sides.
- L2 30 Kc quench coil.

FIG. 2A

- C1 10 mmfd.
- C2 15 mmfd. split stator
- C3 25 mmfd.
- C4 25 mmfd.
- R1 15,000 ohms
- R2 15,000 ohms
- RFC 1/8" dia form 1/2" long wound full #36 en. wire.

FIG. 5A

- C1 5-25 mmfd. var.
- C2 15 mmfd.
- C3 100 mmfd.
- C4 .05 mfd.
- R1 3.9 megohms
- R2 6000 ohm pot.
- RFC 3/16" dia. form, 3/4" long, wound full #34 en. wire.

FIG. 6A

- C1 5-20 mmfd. var.
- C2 18 mmfd.

- C3 100 mmfd.
- C4 100 mmfd.
- R1 16,000 ohms.
- R2 16,000 ohms.
- RFC 1/8" dia. form 1/2" long wound full #34 en. wire.

FIG. 11A

- C1 5-35 mmfd. var.
- C2 100 mmfd.
- R1 22,000 ohms.
- L1 1-1/2 turns #16 wire, 7/16" dia.
- L2 8 turns #16 wire, 7/16" dia.
- RFC 3/16" dia. form 3/4" long, wound full #34 en. wire.

Anderson Greenwood 14

(Continued from page 19)

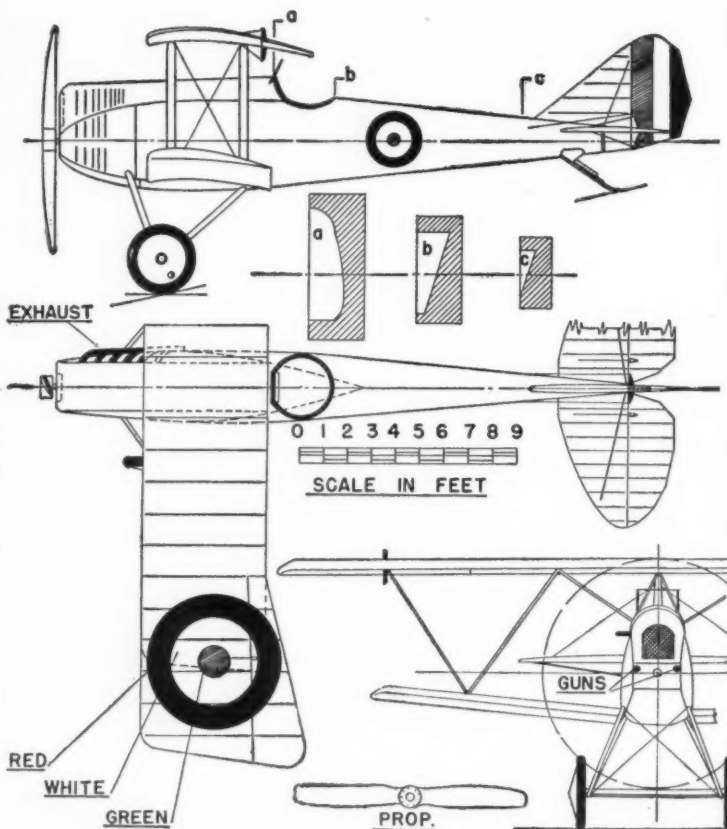
from the point of view of comfort, visibility, convenience and noise reduction, actually it is one of the most difficult design problems in airplane layouts.

On the credit side of the design is simplicity of installation of the tricycle landing gear; safety feature of the tailbooms, which prevents inadvertent "walking into the prop"; location of the propeller noise behind the crew instead of in front; excellent visibility ahead, down and to the side; ease of entrance and exit on the ground; and economy in construction of the fuselage and simple booms.

ITALIAN ANSALDO S.V.A. FIGHTER OF 1917

POWERED BY S.V.A. ENGINE. SPEED WAS 140 M.P.H.

SHIP WAS ALL LIGHT GREEN OR SILVER WITH BLACK DETAILS.



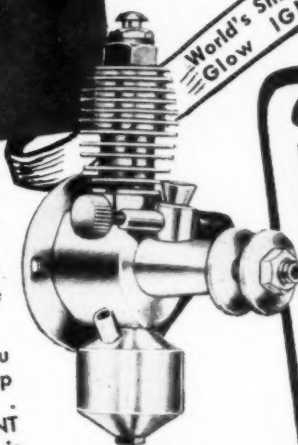
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But there is a debit side of the ledger. Engineers have argued the pusher-vs-tractor controversy since 1910 (when aeronautical science didn't know very much) right up to 1949 (when scientific research with all its costly wind-tunnels and special equipment can't even supply the answer). So often in the past the comparison has been made on the basis of an excellent tractor with a poor pusher design, or vice versa. Today, given two designs on which equal effort has been expended, there is little to choose between the two in efficiency.

For example, the slipstream behind a tractor propeller reduces the efficiency of the immediate wing area but the propeller efficiency itself is high due to its working in undisturbed air. In the pusher, the propeller efficiency is impaired by the disturbed air inflow, but the wing operates in undisturbed air. Thus, the combination of wing L/D and propulsive efficiency for both is about the same.

The pusher does have one problem all its own, however. As it rotates it operates for a portion of the time in clean, undisturbed air (above the wing) and then passes through the wing wake sheet. This wake consists of low energy air, which increases the blade's angle of attack

momentarily. In an instant the blade has sliced through this region and is back at its free-stream angle of attack. However, this periodic change in aerodynamic load on the blade creates a wake-excited vibratory stress in the blade that presents a major design problem. As the blade passes through the lower portion of its circle it also operates in low energy air trailing off the fuselage.

Operation of trailing edge flaps within the diameter of the pusher propeller creates substantial losses and, at low speeds, can actually cause blade stalling in the immediate region with accompanying large losses in efficiency. It is the combination of these losses that robs the pusher of its full advantage over the tractor from the point of view of the main wing efficiency. However, even with this admitted discrepancy the pusher can be made equally as efficient as the tractor and thus its selection as a layout problem can be made on the basis of other considerations without any inclusion of efficiency in the problem.

The rear-engine installation, while neat and attractive in appearance, presents certain problems of its own. Because the engine is blanketed from the airstream, a cooling problem is created that necessitates the use of air scoops somewhere on the body. Scoops are difficult things to design because of their sensitivity to variation in the airplane's angle of attack. It is a comparatively simple job to design good scoops for operation at the design cruising speed of the airplane (at which it will spend 99% of its life) but as the landing approach is made and the attack angle increased to the maximum lift region, then the airflow into the scoops is

reduced greatly and, in severe cases, actually stalls and prevents any flow at all. This means that the scoops have to be designed for the low airspeed condition and a penalty taken in the cruising speed of flight through extra-large scoops.

The AG 14 has combined all the desirable features into a single, all-metal package of pleasing appearance. The crew nacelle is well rounded and roomy with the pilot and passenger sitting side-by-side forward of the wing leading edge. The entire upper half of the nacelle is fitted with transparent panels to provide

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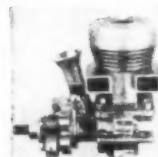


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visibility certainly equal to and probably better than any other lightplane on the market. The doors are wide and full providing great ease of entrance, which is made directly from the ground with no steps or "wing walking" required. This is, at the moment, the only lightplane you "step down into" as the Hudson Motor Car Co. describes their product.

Dual controls are fitted in the form of a flattened, formed wheel mounted on a push-pull tube from the instrument panel. Actually, rudder pedals are mounted on the left side only but rudder is seldom needed in the new design. Throttle is conveniently located in the lower dash between the two wheels. Baggage is stowed immediately behind the two seats in a spacious compartment.

Fuel is carried in the wing on either side of the crew nacelle and it is this close proximity of crew, baggage and fuel near the airplane's center of gravity that comprises one of the salient features of the AG-14—wide range of permissible loading conditions. In flight, as fuel is used up, or on the ground as baggage is removed or added, these changes have little effect on the airplane's stability since they are located so close to the c.g. Although the permissible travel of the airplane's c.g. is no greater proportionately than most others of its type, the narrow range of possible useful load items almost prohibits any loading disturbing to the airplane stability or control.

The AG-14 is powered by a Continental C90 engine, which develops 90 hp at 2475 rpm at sea level. This is a 4 cylinder, air-cooled, horizontally-opposed design, ideal for pusher installation because it is comparatively flat (24 in. high) and short (32 in. long).

The wing is constant chord, which makes for economy of construction (since all ribs are exactly alike) and aerodynamic efficiency (tapered wings create

losses). The constant chord wing is an inefficient structural design, however, due to the constant span-loading on the spar and requires a heavier spar in the in-board region than the conventional tapered wing. However, this effect is not serious in a lightly loaded airplane such as the AG-14. The wing incorporates tip washout in which the tip has a lower incidence angle than the root to preserve its lift near the stall.

Control surfaces are covered with corrugated aluminum sheet, as is the horizontal stabilizer. This provides the required stiffness without the extra time and cost of riveted chordwise stiffeners. The entire wing trailing edge between ailerons comprises flap area to provide a low landing speed.

The AG-14 weighs only 850 lb. empty and has a 550 lb. useful load, giving it a gross weight of 1400 lb. It has a top speed of 120 mph and cruises at 110 mph, low in comparison with the 4 seat private planes now available, but comparable to 2 seaters now on the market. It stalls at 49 mph without flaps and has the really low speed of 44 mph with flaps extended. It has fuel capacity for four hours for a range of 440 miles, about as far as anybody would want to fly without stopping.

The trim little AG-14 made its first test flight on October 1, 1947 and immediately went into extensive flight tests. More than 200 hours of flight time has already been run up on the ship and it is presently undergoing certification tests by the CAA. Upon receipt of the treasured Approved Type Certificate, Anderson, Greenwood and Co. plans to go immediately into production. The price? A-G has not made the mistake of others and advertised a price in advance that must later be raised and re-raised to the disappointment of prospective customers. They are simply keeping mum on the subject and will wait until they can announce a firm tag.

If it's \$2500 or less then the millennium has arrived: a personal aircraft with modern technical features at a price you can afford; and that means that A-G engineers and investors are both talking the same language. And it's the kind of language the buying public will welcome as music to its ears!

The Shrimp

(Continued from page 27)

stalling. Test run the engine with a tank full of fuel and then let your legs decide how long to hold the model before letting her go. Place the ship on a smooth spot and release—the flight that follows will thrill you I'm sure.

Since the ship carries no flight timer, we time it by filling the tank up full, then allowing the motor to run a certain length of time before releasing the model. Since we know how long the motor runs on a full tank, we can quickly figure how long the motor run in flight will be. So, as we said above, let your legs (and your wind) decide.

CO2 fans can fly *Shrimp* also, as the ship will be found to turn in some fine flights. The cartridge holder is shown dotted on the drawing in the approximate position it should occupy. The O. K. CO2 engine can be mounted inverted and completely cowed. The *Infant* wasn't inverted as this would have necessitated changing the tank. Both O. K. CO2 and *Infant* engines are bolted right to the firewall.

The new K & B engine opens up an entirely new field in model flying—let's make the most of this different conception of free flight!

Scrap Box

(Continued from page 9)

chairman he received not a single letter from anyone but committee members, who in turn had to pry the information out of the local lads. Dick commends the fellow members of the committee—Roy Mayes, Chuck Hollinger, Val Sherrard and Ted Schindler—for doing everything possible to present a fair picture of what their areas wanted, and for their willingness to settle differences in the interest of the majority. The precision rules now cover every basic flight path; everything suggested had been simply a combination of these basic maneuvers and actually added nothing as a test of flying skill.

Dick also wants to know how we made out with two *Elmic* timers we obtained from him for use on our Wakefields. These timers are distributed in England by E. Keil & Co. Ltd., London, and Dick keeps a few on hand. Weighing but 3/10 oz., the *Elmic* is ideal, for it has a positive snap action that doesn't fool around. It is well thought out for mounting and has a neat arrangement for holding the arm extended when necessary. Dick showed one in his *Parakeet*, in the January issue of this magazine.

"You mentioned the name of Merrill Hamburg," begins W. S. Hook, Los Angeles, "which brings back many memories since I was a subscriber to the *American Boy* and remember the AMLA. I wonder if you could tell me where I might obtain some of the prints that the AMLA put out for the scale model contest, ships like the Curtiss P-1, Fokker F-10, Ford Trimotor, Lockheed Vega and Boeing pursuit. Please tell me where I could obtain these three-views." We wish we knew, W.S. They bring back memories to us, too, and they would be swell plans to have even today.

H. L. Sadler, Little Rock, has the right technique for getting things done. He has farmed out each-engine-size model of a

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new speed series, though he does the bulk of the work himself. Eddie Schwarz is making the 19, Doc Warden the 29, Ray Shearer the 60, and H. A. Thomas the 49. "They are half metal," Thomas recounts, "quite small, and Sadler really has ironed out every wrinkle. They're made for hand launching, which we expect to see widely done regardless of the rules." H. A. himself has some novel projects, including an Arden 19 low wing and a low wing Wakefield with two wheels that swing up behind the trailing edge of the wing for semi-retraction. Before you snoot this low wing deal, remember that it was Little Rock in the old days who built and flew so many low-wing gassies. H. A. has had up to 5 minutes from low wing rubber sport models.

Knowing our enthusiasm for sport free flight, H. A. makes some interesting remarks about the kind of flying they used to do in Arkansas. "The fact that sport flying in free flight seems to be on the uptake is sweet music to me," he says. "Back in 1938 we really logged the flights. I flew a Brown-powered low wing job 36 times in one afternoon until my legs tired out. Next Sunday Lewis Brewer flew his Midget-powered Rearwin 45 times just to lick me. He'd let it drift downward, then he'd come upwind in a car and repeat. The trouble is that so many beginners are led to believe that spinning, overpowered contest jobs are all there is to free flight." You can say that again, brother. Note the words "are led to believe." We are the leaders.

You know, this reminds us of the colossal hog wash we give out with about models being more stable than real planes. Many light planes today are far more stable than any free flight model. Even Jimmy Doolittle would be afraid to ride in some of the high-powered critters we create. For example, there is our Wakefield model which is a pretty stable proposition from a modeling point of view. But use a little too much tail and the glide tightens up into a spin. You've done it, too, maybe with a free flight. Under similar conditions any good lightplane refuses to spin. Why, we know so little we can't even keep our wingtips from stalling out! Walt Good tells us about his new radio model, how it has both tips washed out to make the center of the wing stall first, for a nice straight ahead stall and not a tip stall and spin. That's the sort of thing we mean.

As you fellows know we are a strong CLA man. But fellows like Pete Bowers and Hank Cole who know a thing or two about airplane design have made us realize that you can't compare too well a ship with a lifting tail and a rearward located CG with a forward located CG. Much of the stability comes from that CG location, and the farther back you locate the CG the more you ask for trouble, both big or little planes. Apparently we build spin happy airplanes and then depend on adjustments.

Les Morris—a British model dealer who runs Morris's Model Mecca—342 Grove Green Rd., Leytonstone, E. 11, England—makes us realize how lucky we are even if our radio job did cost more than a hundred bucks to build, and a simple free flight cost us close to twenty without engine. Seems that the Board of Trade has just socked on a one-third tax for all fabricated parts—that is, engines, tanks, wheels, timers, spinners, and so on. This, he thinks, will tend to revive the secondhand market, especially in American engines. Les, a member of the West Essex Flying Club, hopes someone will swap a Forster 29 for some British products. Ardens, McCoy's, also wanted. He sends us a couple of shots of our twin-boom pusher built from M.A.N. plans by Les Mowbray, apparently a better builder than the writer.

Les passes along one of the funniest stories yet about R.C. "Radio control is now becoming a big interest," begins Les, "two of the big fellows, Henry Nicholls and Eddie Keil are having a go. Henry's job is a 9-ft. span, whacking great pylon for wing mount with engine (Spitfire) on top, radio gear by Corsor. Saw it fly on Sunday last, weather very windy, and it either got out of range or Henry lost control, for the kite went straight on for about 2-1/2 miles. As

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Your pocketbook tells you what price kit to buy. But for only 50c. you can have the complete makings of a sure-flying, rugged Berkeley "Famous Flyer."

There just isn't anything like a Berkeley "Famous Flyer." Here are small editions of national and state records. Yes, sir, proven designs which will give the beginners the "buy", to go on to bigger and better models.

These Berkeley "Famous Flyers", are really rugged. Full 3/32" balsa construction throughout, not the usual weak, hard-to-handle 1/16" found in low priced kits. Covering material is genuine "Silkspan." That's the American paper that doesn't fall apart when you wet it.

Look friend, you don't have to shell out 50c for "extras", after you buy the kit. All the extras are in the kit. That's right.—a brown contest rubber motor, a large tube of cement, wheels and formed wire fittings are standard with Berkeley "Famous Flyers". What's more, you can install small CO-2 engines in these models, too.

Yes, sir, get down to your hobby dealer today, and see these kits, before he is sold out.



26" POWERHOUSE JR.



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If you are lucky enough to have a good gas engine between .19 and .49 displacement, Berkeley's Cessna "195" is the perfect scale "Controliner" for you.

This is the most beautiful kit you ever saw, with its shiny plastic cowl and complete full color decal numerals and striping.

Easy to build, too, a couple of nights work and you have the model ready to fly. See it at your dealers. We know you will want it.

*ALL WOOD PARTS PRECISION CUT TO SHAPE

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it flew out of sight Henry remarked, "Well, I still have the transmitter."

Robert Hoyer, a U-control sport fan from Cleveland suggests: "Although my closest connection with a contest has been as spectator, my experience with two- and three-foot sport jobs makes me think the solution for dealing with the saturation point of speed models seems easy—without fences. First abolish all the classes, let an Arden compete with a Dooling, but establish a wingspread and weight that each size motor must tote. Give the owners of large motors some work to do for their larger power—none of these 60's pulling a 10-inch wing." It may not be as easy as that, Bob, but the thought is interesting. Bob also thinks that landing gears, and both takeoffs and landings should be required. We'd like to see that, too, but after all we're sport minded. One of these days some bright character will figure out a way to get rid of the wings—then we will express speeds in terms of muzzle velocities.

D. W. Root (Root's Hobby Hut, Oakland, Calif.) shows us some magnificent Kodachrome prints of his latest A-symmetrical stunt model. It uses a Madman wing and a Spitfire 604 engine, cowed, and set on its side. There's no use trying to describe the ship—it's a knockout. Root says it has excellent performance, performing as well as conventional airplanes of the same size. Although it is a brilliant red, there is no red dope on the ship. Colored China silk was used. Weight is 44 oz. with ignition, speed 70 mph, and area 412 sq. in.

Ocie Randall, Fresno, reminds us with excusable pride how well his Fresno gang did at Detroit in free flight. Young Carl Randall got first in D, Senior; Freddie Morgan, first in B, Jr.; and Thomas Diel, first in D, Jr. Better late than never, Ocie, so please accept congrats. We see by Randall's Fresno Model News that Fresno walloped Bakersfield in a free flight challenge meet. What makes it interesting is the fact that, by coincidence, Fresno flew all ignition and Bakersfield all glow plug. The glow boys had difficulty putting in their flights, mostly because of too much power! Every Fresno entrant put in three flights, so the challenge trophy stays at Fresno.

Everybody and his uncle has a tall story this month. We are going to hold out some of the tallest for future issues. For this month there is a cute one from Tom Kister, Duncan, Okla., that should strike a responsive note among U-controllers who remember their first loop.

"One day at the local stadium," begins Tom. "I was flying an original Bluestreak powered Sojac. It was a huge thing intended for a stunt job. I couldn't get it to take the control. Or maybe it was me. Anyway, it hit 70 or 80 and really was too fast for me to stunt at the same time. I flipped it into a vertical climb but gave it too much up and it went behind me. I shut my eyes and gritted my teeth. I waited for the smash. I gave it full up as I shut my eyes. I heard it behind me and then I heard it in front of me. I opened my eyes and there was Sojac flying level as if nothing had happened. My buddies came over and congratulated me on my loop and I didn't even get to see it!"

That rates you the free subscription for one year to MODEL AIRPLANE NEWS, Tom, for the best tall but true story of the month. (Aside to you story tellers: you'd better keep a stack of Bibles handy!)

TEAM RACING

Even the top winners in controline speed concede that some changes in C. L. contest work are needed to allow more fliers to "get in the act". One very successful new approach is called "team racing", where the stress is on realism and speed is secondary. Full details on this new form of racing, together with plans for a successful racer, will appear in

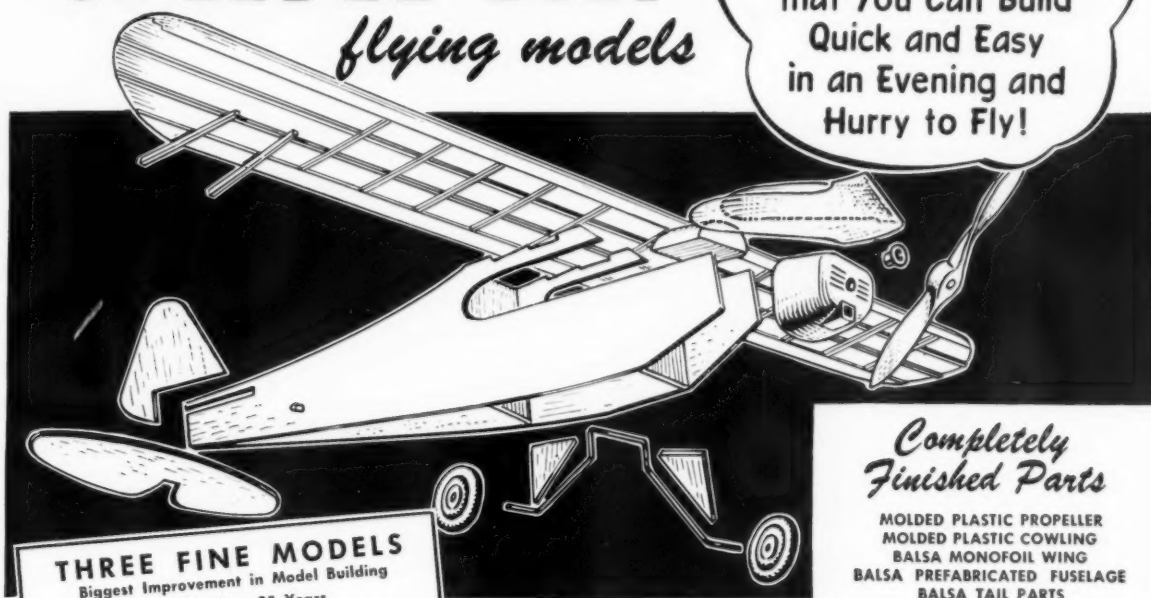
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See the picture of SPEEDEE-BILT parts above. The balsa wing comes to you as shown with leading and trailing edges, all spars, and top planking built in. You add only the simple ribs. The prefabricated fuselage goes together in no time at all with fuselage sides, bulkheads, cowl block, molded plastic cowl and transparent cabin enclosure completely finished exactly as shown above and ready to drop in place. Tail parts too — and landing gear — are completely finished as pictured — nothing to cut out, bend or shape. Rubber motor and molded plastic prop with something new in metal bearings, eliminating all hooks and wire parts, can be installed in a few seconds.

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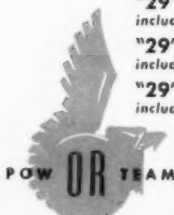
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